

**Abstracts of papers presented at the
15th International Symposium on Logistics
(ISL 2010)**

***Configuring Next Generation
Supply Chains***

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INTRODUCTION

We would like to welcome our friends and colleagues to the annual International Symposium on Logistics (15th ISL). It is 17 years since the first symposium on Logistics was held in Nottingham in 1993 and has now become a regular, well-established and premier international event in the field of Logistics and Supply Chain Management. As always many members of the ISL community look forward to meeting, sharing and exchanging their research ideas and results in both a formal and informal setting which the symposium provides. The ISL series continues to grow in strength and stature in terms of contributions made by the participants to the field of Logistics and Supply Chain Management. Similarly, the concept of alternating the symposium every year between Europe and the rest of the World is now well established. To date this event has successfully been held nine times in Europe (Nottingham, UK 1993 and 1995, Padua, Italy 1997, Florence, Italy 1999, Salzburg, Austria 2001, Seville, Spain 2003, Lisbon, Portugal 2005, Budapest, Hungary 2007, Istanbul, Turkey 2009) and five times outside Europe (Iwate, Japan 2000, Melbourne, Australia 2002, Bangalore, India 2004, Beijing, China 2006 and Bangkok, Thailand 2008). This year's event in Kuala Lumpur, Malaysia continues with the tradition following the very successful and productive event held in Bangkok last year. As usual ISL 2010 brings together leading academics, researchers and practitioners to exchange ideas, views and the latest research in the field of Logistics and Supply Chain Management.

The theme of this year's 15th International Symposium in Logistics is "Configuring Next Generation Supply Chains". Configuring the next-generation of supply chains supply chain requires attention to the dimensions such as designing the right logistics network, engaging in the right alliances and partnerships, developing contingency plans against uncertainties and selecting the right manufacturing processes, inventory levels and distribution strategies. This also means the need to develop network of all the entities in the extended supply chain, from product design and development to procurement and sourcing, supply and demand matching, logistics and distribution, sales force automation, and customer support. Within the extended supply chain, Information and Communication Technology (ICT) plays a central role by facilitating dynamic planning of flow of products, and assists in controlling and monitoring the execution of commercial transactions. The increasing level of international trade between countries often implies higher uncertainty and thus the need to identify underlying causes and strategies to protect against potential disruptions and risk. In order to address some of these issues it is important to capitalise on the know-how and expertise of academics as well as practitioners in the industry to share and exchange the emerging trends and developments. In our view the 15th ISL in Kuala Lumpur represents a timely opportunity for academics and researchers to address pertinent issues surrounding logistics and supply chains within a global context. Malaysia is a country that has a rich history, tradition and culture and is uniquely positioned to face the challenges that lie ahead over the next decade or so. We are optimistic that this year's event provides an opportunity to address some of these issues and challenges.

Potential authors were invited to submit an abstract to the Symposium Chairmen. All abstracts were reviewed by two experts from the International Advisory Committee and final papers were further reviewed by an International Panel of Reviewers. As a result papers are included in this volume with contributing authors coming from countries. This book of proceedings has been organised according the following categories:

- Supply Chain Management
- Supply Chain Inter-Firm Networks and Collaboration
- Supply Chain Performance Assessment
- Risk and Visibility
- Supply Chain Dynamics and Inventory Management
- Decision Support Systems and ICT in Supply Chains
- Environmental Sustainability and Green Logistics
- Management of the Customer-Supplier Relationship
- Design Configuration of Supply Chains
- Reverse Logistics
- Transport, Distribution and Third/Fourth Party Logistics

We would like to take this opportunity to express our sincere thanks to all the presenters, delegates, reviewers, Advisory Committee members, local organisers especially and guest speakers for their interesting and valued contributions.

Finally, our very special thanks go to Alison Parrett for her wonderful all round administrative support throughout the entire organisation often under stressful, demanding and unpredictable circumstances.

Professor Kulwant S Pawar – July 2010

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SECTION 1 – Supply Chain Management

LIFE-CYCLE ORIENTED POSTPONEMENT IN INTERNATIONAL SUPPLY CHAINS

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ABSTRACT

Purpose of this paper

Despite a great number of publications on postponement [1], a practically applicable method for the right placement of the order penetration point (OPP) is still missing, let alone for the global context of automotive supply chains which extend to such distinct markets as the Brazilian and the German one. The paper depicts how to realise the dynamic (re)placement of OPP.

Design/methodology/approach

In order to do this, it is essential to consider current and future challenges within this topic and to align research with these challenges. In 2001, Van Hoek [2] published a well received paper in which he reviewed the postponement literature prior to 1999 and identified challenges for future postponement research. The scientific progress on these challenges hitherto was presented by Boone et al in 2007 [3]. Furthermore, based on their extensive literature review, they defined new challenges to postponement research. The relevant challenges stated in these papers serve as a framework for the development of a model for the placement of OPP.

Within this context, the research aim is to develop a dynamic method for the placement of OPP in global supply chains over a complete product life-cycle considering a systematic investigation on the influence of product diversity, resource flexibility under a supply chain perspective and the process adaptation of manufacturing processes along the supply chain

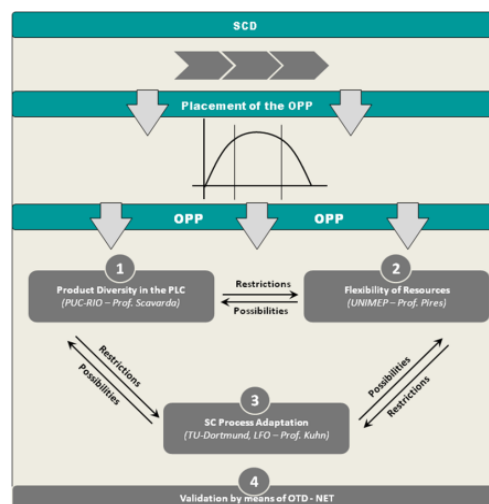


Figure 1: The research strategy

Findings

In order to develop a method for the specific placement of the OPP in global automotive supply chains by the example of Brazil and Germany over a complete product life-cycle it is vital to consider the current and future challenges regarding research about the order penetration point. The method for the life-cycle oriented placement of the OPP in international supply chains meets all challenges drawn up by Van Hoek [10] and Boone et al [11].

Research implications

In order to develop a dynamic method for the placement of OPP in global supply chains over a complete product life-cycle research covers the influence of product diversity, resource flexibility under a supply chain perspective and the process adaptation of manufacturing processes along the supply chain.

Practical implications

With this method not only several gaps in academic literature are addressed, but a practically applicable method for one of the major issues in industrial supply chain management - OPP placement - can be derived.

What is original/value of paper

The novelty of this paper is a research methodology for the right placement of OPP.

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IMPLICATIONS FOR JIT/LEAN MANUFACTURING IN THE EGYPTIAN MARKET

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ABSTRACT

Purpose:

Just-in-time (JIT) is a key underpinning technique for the implementation of lean manufacturing. Lean manufacturing has been identified as a source of competitive advantage on a global scale and with JIT systems integral to the concept as applied by pioneering organizations. While previous research has shown the obstacles and enablers for contextualising JIT systems in a developing economy, little has been done in the case of Egypt. Previous research has indicated that Egypt's manufacturing sector lags decades behind the so called "world class" organisations. It identified the obstacles to the implementation of JIT systems in Egyptian organizations. The inability of Egyptian organizations to implement them has created a gap between Egyptian and global organizations. The reasons for this gap are investigated here.

Research approach:

The issues of JIT in Egypt are explored by conducting statistical analysis of data accumulated through 10 structured meetings and surveys throughout 10 different Egyptian business sectors, with a total of 35 participating organizations. This equals a response rate of 43.2% to the questionnaire. Statistical findings were supported by previous research.

Findings and originality:

Findings showed that 75% of respondents did not currently have any JIT relationships and are not willing to implement it in the near future. 80.6% have indicated the need for more information prior to JIT implementation, while 67.8% perceive positive economic impact of JIT implementation. This was further established by 53.3% of respondents disagreeing to the possibility of negative economic impact of JIT implementation. These findings, supported by several previous researches, have provided proofs of currently existing obstacles such as bureaucracy, imports procedures, long reorder steps, and bad logistical systems, accompanied by the cultural barriers. All of this impede Egyptian organization's performance and provide a high resistance to JIT implementation. Respondents also agreed that JIT implementation would, in the long run, be beneficial and would lessen the gap between Egyptian and world class organizations via lobbying with governmental in order to improve the procedures; this should be supported by well established training programs aiming at developing the organizational culture and overcome barriers and resistance to change.

Research impact:

A limitation was the inadequate number of cases of JIT systems in Egypt causing insufficient in-depth analysis. Second; the degree of comprehension of JIT/Lean manufacturing in Egypt was minimal. Third; most organizations regarded the information required by this research as "Classified Data."

Practical:

Egyptian organizations' mentality must be enlightened by the benefits of applying modern production methodology. Further research may explore the cultural aspects of the adoption of such methodologies.

Keywords:

JIT, Lean systems, Supply chain management, Cross-tabulation analysis

PROPOSING A CONCEPTUAL FRAMEWORK OF RISK DISTRIBUTION IN THE SUPPLY CHAIN: A CRITICAL LITERATURE REVIEW

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ABSTRACT

Purpose:

The aim of this paper is to develop and propose a conceptual framework for risk distribution strategy in the supply chain. This proposed framework is derived from the prior literatures. It is hoped that this proposed framework for risk distribution in the supply chain will provide a better understanding on how risks in the supply chain can be distributed and mitigated.

Research approach:

A critical literature review (Croom, Romano and Giannakis, 2000; Coley, 2008; Schoenherr, 2009) of related literatures was conducted in order to conceptualise and develop the proposed risk distribution in the supply chain framework.

Findings and Originality:

The proposed risk distribution framework provides insights on how risk distribution in the supply chain is assigned and/or allocated. This is an area in the supply chain risk management strategy body of knowledge that has not been widely researched.

Research impact:

The described outcome from the paper is still relatively limited as further validation needs to be conducted to further support both internal and external validity. However, this proposed framework represents a significant gap in the literature on supply chain risk management strategy.

Business impact:

The validated conceptual framework is of future benefit to business practitioners in term of strategy development related to supply chain risk management. The proposed framework will offer insights on how to decide risk distribution for mitigating their supply chain risks.

Keywords:

Risk management, Supply chain risk management, Risk management strategy

TOPIC: Supply Chain Management / Supply Chain Dynamics

References:

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THE PRACTICE OF EXECUTING SUPPLY CHAIN STRATEGY AMONGST THE MAJOR PARTNERS

Ian Sadler
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ABSTRACT

Purpose:

The strategies of most companies can only be effectively executed in collaboration with other supply chain members. Although there is some research into strategy execution (Hrebiniak 2005), there is no research into combined execution of strategy by supply chain (SC) partners. This review aims to determine the best way to proceed in this little known area. It will enable future research by observations of the process of execution of strategy in Australian SCs to help configure the 'next generation' of supply chains.

Design approach

The approach is to use existing knowledge to derive the theory and practice of SC strategy execution from the formation and execution of strategy in single companies, a 'practice' approach to such formation and the limited knowledge of SC strategy execution. The distinctive approach is to emphasise what people in SC partners do in relation to strategy and how this is influenced by and influences their organisational and institutional contexts (Johnson et al 2007).

Findings

The result is these research questions:

1. How can a suitable, effective supply chain strategy be recognised?
2. Given (1), what relationships and organisational and informational features are helpful in execution and how do these rank?
3. Given (2), what process will provide collaborative partner companies in a SC with the best chance of successful execution of their aims to achieve their business objectives?
4. Will a longitudinal study of supply chain partners with an emphasis on strategy practice yield insights into the process of executing their chain strategy?

Originality/ Value

Execution of supply chain strategy is a critical component in the management of partners in a supply chain. It can greatly assist their customers' satisfaction, their cost base and revenue. The original value of this paper is to determine the theoretical underpinnings of such strategy execution and outline the research required to extend knowledge of such execution in 'next generation' SCs.

THE INFLUENCES OF DEMAND UNCERTAINTY ON THE RELATIONSHIP BETWEEN SUPPLY CHAIN INTEGRATION AND DELIVERY PERFORMANCE

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ABSTRACT

Purpose:

Previous studies suggest that supply chain integration could improve delivery performance but its performance implication could be impaired by demand uncertainty. This paper clarifies and tests the moderating effects of demand uncertainty on the relationships between supply chain integration and delivery performance.

Research approach:

Based on a survey questionnaire with 151 firms from Thai automotive industry, hierarchical regression models are used to test the moderating effects of demand uncertainty.

Findings and Originality:

The findings indicate that demand uncertainty had significantly and negatively moderated the relationship between supplier/internal integration and delivery performance. This means the positive impacts of supplier and internal integration on delivery performance became more effective under a low level of demand uncertainty. Customer integration was not significantly associated with delivery performance and this relationship was not affected demand uncertainty.

Research impact:

This paper contributes to the development of a contingency theory of supply chain integration. Our findings suggest that under a certain condition (e.g., low demand uncertainty), supplier and internal integration became more effective.

Practical impact:

The findings further provide practical guidance to logistics and supply chain managers on the effective implementation of supply chain integration under demand uncertainty.

Keywords:

Supply chain integration, Delivery performance, Demand uncertainty, Contingency theory.

NATIONAL CULTURAL DIVERSITY AND GLOBAL SUPPLY CHAIN MANAGEMENT

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ABSTRACT

Purpose: In an era of global supply chains, the vast majority of supply chain theory is bound up within the North American and European business contexts. To investigate its generic applicability within a global context, this study investigates how national culture affects the uptake of supply chain management theory in practise.

Methodology: Hoefstede's (1980) well-known measures of international work-related values are used to compare the behaviours of a cross-national sample of supply chain managers. The exploratory research involves an anthropological approach of observing supply chain management behaviour within its natural setting.

Research Implications: Supply chain management concepts need to be adapted to cater for managers' cultural diversity. Identifying the most desirable supply chain improvement destination requires understanding of national, organisational and individual cultural norms. In particular, the pathway to change and the desirable leadership role must be matched to the demands of the local cultural environment.

Research Limitations: A limited number of national settings, and cases from each national setting, are investigated. Hence there is significant scope for further exploratory, intra-country and inter-country research into national cultural diversity and global supply chain management.

Original contribution: The general uptake of supply chain management in practise is slow and rather disappointing, particularly given some twenty-plus years of academic research. Although supply chain management concepts seem to be geographically generic in application, the setting directly affects the approaches undertaken in practise. The cultural values in Asian versus Anglo-Saxon working environments significantly affect supply chain management practise.

Key Words: Global supply chain comparisons, national culture, anthropology

DRY PORT DEVELOPMENT: A COMPARATIVE STUDY OF THE UK AND THE FAR EAST

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ABSTRACT

Purpose:

This paper reviews the development of dry ports in the United Kingdom (UK) and Far East. Dry ports in the UK are widely recognised as models for similar facilities which have been developed elsewhere. They are invalidly strategically located close to main population and industrial centres. The development of Inland Container Depots (ICDs) in the United Kingdom started in the 1960s based on the growth of container shipping which drove, and continues to drive, the need of multimodal transport. In the United Kingdom, two major effects have shifted the overall trend towards containerised shipping. (i) Ports in the south-east of the country were more attractive to shipping lines because of their proximity to continental Europe and (ii) major producers and owners of cargo were often no longer located conveniently near the port at which their cargoes were handled. However, in the case of the Far East, the emergence of "off-shore" ports is driven not by proximity to main population or industrial areas but by the need to support the rapidly growing container flows. Under the framework of ASEAN+1 (ASEAN and China), the development paths of Far East Ports have shown some differences in comparison with United Kingdom. This paper highlights and explains these differences.

Research approach:

From commercial companies and first hand field work, data were obtained over a period of six months. An international comparative study was carried out in both the United Kingdom and in the Far East. A theoretical basis for this study is provided by a spatial analysis of several countries using König numbers as an analytical tool.

Findings and Originality:

It is shown that the demand for ICDs in the United Kingdom has reduced due to the expansion of the European Union which had led to the streamlining of customs clearance processes. In turn this has reduced the need for conventional clearance points in the case of European Union sourced trade. In the Far East, however, there is no equivalent customs clearance regime with result that, given the rapid growth in trade in the region, there is potential for large scale expansion in ICDs which take the form of "off-shore" ports.

Research impact:

By using König numbers as a basis for analysis, various phases of "off-shore" port (ICDs) development could be modelled to provide a strategic tool for improving port and logistics chain efficiency.

Practical impact:

In practice, this research could be used for identifying fresh decoupling points in supply-chains, especially where large volume of goods is moved internationally via the sea ports. Further, this modelling approach, founded on the early ICDs strategy of the UK, can contribute to reducing congestion in the ports.

Keywords: Inland Container Depots (ICDs), Dry port, port congestion.

PROBLEMS AND CHALLENGES FACING A MARKET ORIENTATED SUPPLY CHAIN APPROACH

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ABSTRACT

Purpose:

Adopting a market orientation approach to organisational culture has been advocated by numerous authors as a key foundation for sustained competitive advantage to be achieved. The purpose of this paper is to identify the potential conflicts that may exist between these three pillars, with special reference to the current, very challenging trading conditions. Are these conflicts presenting problems for organisations which are limiting their capabilities to realise the full potential of a market orientated approach?

Research approach:

The research design is divided into two elements. Firstly, a literature review is carried out which establishes three pillars for defining a market orientation and covers how authors have advocated it as an important antecedent to successful strategy implantation. The second element is empirically based and is divided into two parts. The research takes the UK touring caravan industry as a case study for the paper. The use of pilot studies, initially examines the customer orientation pillar via a consumer survey. The second part addresses both the competitor orientation and the inter-functional coordination pillars. It involves semi structured questionnaires which are again conducted using a pilot study which is e-mailed to senior personnel from the caravan industry's supply chain.

Findings and Originality:

Market orientation is a necessary but not a complete panacea for organisations to achieve a sustainable competitive advantage. Market orientation provides the necessary foundation but needs to be complemented by further orientation cultures: in particular a production orientation needs to be married with the market orientation approach. This builds upon the work of Lynch et al. (2009) which found that "in pursuing a supply chain management strategy it is important that production, marketing and relationship orientations all need to be balanced".

Research impact:

This is a focused study, exploring the UK touring caravan industry. The UK caravan industry is a small, but nevertheless significant, sector of the UK economy accounting for £1.6 billion of turnover annually (Timms, BERR 2007): the research therefore has implications for players in the sector itself. Moreover, despite its unique aspects, the industry has some parallels with demand and supply challenges encountered by other sectors such as automotive, van, truck, or even white goods manufacturing industries. This means the study has some wider generic application outside the caravan sector.

Practical impact:

The uniqueness of the caravan sector limits the ability to fully generalise findings across all potentially parallel sectors. The small scale of the UK caravan sector also restricts the pool from which senior personnel available to be interviewed are available. The use of pilot studies tests the face validity of the questionnaires in preparation for a more in-depth study. The research is significant as it challenges studies, such as Narver and Slater (1990) which imply a market orientation will on its own improve business performance.

Keywords:

Market orientation; supply chain; key challenges

LICENSING AND INNOVATION IN DIFFERENTIATED MARKETS

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ABSTRACT

This paper examines technology licensing in a differentiated duopoly model in which a research laboratory has a cost reducing technology or a quality improving technology and can license the innovation to one firm producing a lower quality product competing with another firm producing a high quality product. Unlike the literature that has focused on a single innovation, this study considers both product and process innovation.

We analyze a two-stage game in which in the first stage, the patent holding laboratory decides whether it licenses its product innovation or process innovation to the firm producing the lower quality product and in the second stage, the two firms engage in price competition in the product market.

The equilibrium licensing contracts under fixed fee and royalty licensing are characterized. We then provide conditions under which the patent holding laboratory gets larger profits by licensing product innovation under fixed fees than under royalty. We also establish conditions under which the patent holding laboratory gets larger profits by licensing process innovation under fixed fees than under royalty.

The main contribution of this paper is that the equilibrium licensing contracts are derived under fixed fees and royalties in a differentiated duopoly model in which a patent holding laboratory can license product innovation or process innovation to a firm in the industry.

Paper Type: Research paper

FLY TIPPING ENFORCEMENT: A UK LOCAL AUTHORITY SERVICE SUPPLY CHAIN DESIGN PROBLEM

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ABSTRACT

Purpose of this Paper

Local authorities in the UK are the administrative units of local government responsible for providing education, housing, health & social care and environment & planning services. The latter is heavily logistically oriented as it includes as part of its remit rubbish and waste collection, recycling, highways maintenance and road gritting. These are all high profile and topical issues in the UK, with media attention increasing customer service expectation in a period that coincides with increasingly stringent resource and budgetary constraints as the UK moves towards a General Election. Effective and efficient supply chain design is consequently important for local authorities in the UK. The purpose of this paper is to provide a case study of a little discussed supply chain design and improvement scenario from within this service portfolio. The supply chain in question involves the material and information flows associated with 'fly-tipping' clean-up and enforcement (prosecution). Fly-tipping is the illegal disposal of waste on land other than an authorised landfill site. It is an important local government issue as its removal absorbs significant council resources, and it is high on the list of concerns of local residents.

Design / Methodology / Approach

This paper was the product of a collaborative project between Torfaen County Borough Council (TCBC) and Newport Business School (NBS). It was funded under the Welsh Assembly Government's Strategic Insight Programme (SIP), which is designed to stimulate the building of relationships between academia and practitioners. SIP does not permit research, so this is a case study and not a research paper. The actual fieldwork involved approximately 50 hours of structured data collection with ten TCBC members of staff drawn from all four echelons of the Fly-Tipping supply chain. Data collection techniques included interviews, observation and document collection.

Findings

Eighty separate issues were identified during the course of the project. The current design consequently results in unnecessary delay, inefficiency, sub-optimal use of logistical assets, and ultimately a relatively low prosecution success rate and hence deterrent to future fly-tipping. Themes included (a) the confusing and overly complex means for the public to register fly-tipping complaints; three separate telephone numbers and four separate email addresses (b) Inappropriate routing of information to the relevant agency for initial response (c) Proliferation and lack of interoperability of IT systems (d) Misalignment of different supply chain echelons and components (not just performance measurement, but also threshold criteria for stimulating a response).

Practical Implications

The issues identified during the course of this exercise revealed a significant opportunity for process and supply chain improvement. At the time of writing, TCBC and NBS are in the process of scoping an applied research project that will follow-on from this. This project will apply Systems, Lean and Theory of Constraints principles to the fly-tipping and other environment & planning services in order to realise significant service level and efficiency improvements. The wider aim of this follow-on project will be to test and develop process and supply chain design principles for the astringencies of the public sector.

What is Original / Value of the Paper

Fly-tipping is a novel supply chain scenario that presents challenges for the application of conventional logistics and supply chain 'best practice'. This adds to the relatively few case studies on supply chain design and management in the public sector.

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THE EMERGENCE OF SUPPLY CHAIN ECO-SYSTEMS A SOCIAL NETWORK ANALYSIS (SNA) PERSPECTIVE

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ABSTRACT

Purpose

The 'eco-system' analogy has become increasingly popular over recent years as scholars have studied the impact of specialisation along supply chains and in particular various interdependencies that emerge (Dervitsiotis, 2008; Simichi-Levi, *et al.* 2008). Social Network Analysis (SNA) is a dynamic approach that focuses attention on network interdependencies and emphasises the impact of network design on firm competitiveness. The aim of this paper is to investigate the usefulness of SNA in an analysis of the impact of specialisation and resulting interdependencies along supply chains.

Methodology

We adopt SNA techniques (Knoke & Kuklinski, 1996) to investigate the emergence and behaviour of SME (Small & Medium-scale Enterprise) dominated supply chain networks. We used a Mixed Method research design that combined quantitative interviews to collect network data with semi-structured qualitative interviews to elicit action, strategy, motivation and other normative aspects.

Findings

We find that SNA coupled with qualitative data provides a good insight into the interplay of different forms of proximity: spatial, organizational and relational; and into the relative importance of codified and tacit knowledge in creating competitive advantage. In addition, we observed a clear distinction between means used to establish relationships and those used to maintain them. Various types of interdependencies are observed including sequential (vertical flows along the supply chain), pooled and reciprocal.

Our findings support the argument that the networks are neither exogenously determined nor static. Rather they are "snapshots" in time that are created (and modified) by the agency of the actors within the network – oftentimes guided by or constrained by the network position in which those actors find themselves at that particular point in time. Thus our networks are socially constructed.

Conclusions

Little attention has been given to the use of SNA in supply chain analysis, with some exceptions such as Lazzarini, *et al.* (2001). We find the use of mixed methods including SNA techniques together with qualitative measures offers a useful analytical approach to the study of what has often been considered a rather intangible phenomenon. In particular, we find SNA techniques such as sub-group/cliq and centrality measures useful in studying emerging supply network 'eco-systems'.

Research limitations

Our application of SNA techniques is limited to studies of SME dominated supply networks. While this initial work offers promise further application of these techniques to a wider range of supply networks, including those involving larger scale organisations and wider spatial boundaries, is required.

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COMPETENCY GAP ASSESSMENT FOR OPERATIONS MANAGERS: A CASE STUDY OF A LARGE AUSTRALIAN LOGISTICS FIRM

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ABSTRACT

Purpose

The objective of this study is to assess the competency gap of operations managers of a large logistics firm in Australia and to identify areas for improvement.

Design/methodology/approach

A survey instrument with four functional and eight fixed competencies was used to collect data. A factor analysis of the collected data produced four functional and six fixed competencies. Paired t-test was performed to assess the significance of difference between importance and current competency. The items/tasks of the derived competencies were then subjected to importance-competence matrix (ICM) analysis.

Findings

The top three competencies assessed by the operations managers are integrity, delighting customers, and managing results. The difference between importance and current competency level for all competency items were found to be significant at $p < 0.01$ and $p < 0.05$. ICM analysis shows that within the functional competency cluster four task-related competencies required to be further developed, whereas, within the fixed competency cluster seven task-related competencies needs to be developed.

Practical implications

Results of the can be used to develop training materials and programs for operations managers of the case study organisation and for other similar logistics firms in Australia.

Original value of paper

This study provides a simple but an innovative approach for assessing competency gap and identifying training needs.

Type of paper - Research paper

Keywords – Australia, Managerial competency, Operations manager, Logistics firm.

THE POTENTIAL OF SERIOUS GAMES FOR SUPPORTING THE IMPLEMENTATION OF THE INTELLIGENT CARGO CONCEPT IN SUPPLY NETWORKS

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ABSTRACT

Purpose:

Multi modal supply networks comprise stakeholders like shipping agents, consignees, dispatchers, ocean carriers or port authorities additionally to the supplier and customer. The corresponding information flows between these stakeholders are of complex nature, since each partner has different requirements on the structure and format as well as on the information content, depending on whether we consider the upstream information accompanying the material flow (freight papers, status information) or downstream information flowing in the opposite direction (like order fulfilment and confirmation). For planning and coordination reasons it would be preferable to have real time access to the status information, but this is hardly possible at the moment. Consequently, most of the planning and coordination processes are based on limited information access and no real time data access although modern information and communication technologies (ICT) could provide real time status information.

The availability of today's modern ICT enables the acquisition, processing and distribution of almost any information about a shipping order independent from its current location. A concept to enrich the freight to be shipped by intelligent ICT is the "intelligent cargo concept" (EURIDICE, 2009). The aim is to improve the planning and coordination processes of different stakeholders in a supply network

The introduction of new ICT as well as changes in organizational structures generate new requirements in the skills and competencies of involved staff, which needs to be mediated (Hausladen, 2008, EURIDICE 2009b). Additionally, employees need to be aware of possible impacts, to understand how these technologies affects the processes as well as being able to handle any new devices. The past experience of the authors' research organisation (Windhoff, 2001), shows that serious games have the potential to support exactly these measures. In this paper, the applicability of serious games is discussed to support the introduction and implementation of the intelligent cargo concept within supply networks under consideration of different stakeholders.

Research approach:

- The research approach comprises the following three main steps: Identification of trainings needs based upon analysis of several use cases
- SWOT analysis of different serious games
- Concept of the training approach: mediation, awareness raising and learning

The work is based on user requirements regarding training on Intelligent Cargo collected within the EURIDICE project as well as on the experience of the researchers in the design and use of serious games in training.

Findings and Originality:

This article discusses the potentials and limitations of using serious games for mediating skills needed for applying advanced ICT concepts in supply networks. It also discusses under which circumstances such games can be used for increasing the awareness and the understanding of the impact these technologies may have on the business processes in supply networks.

Research impact:

Serious games have been used for mediating skills on complex systems for several decades in the military education (Hays, Singer, 1989) and since the 1950's there is an increased use of games also for civil purposes (Wolfe, Crookal, 1998). Serious Games are mostly used for teaching purposes. In the area of logistic, serious games have been developed for mediating skills on insulated problems like the bullwhip effect on understanding the supply chain as such or for improving the collaboration among employees working in supply or production network. These are only a few examples but it illustrates the large variety of applications, used for mediating specific skills and have been proven to be quite effective (Windhoff, 2001). The implementation of the intelligent Cargo concept requires that the game will support a paradigm shift, i.e. it needs to increase the awareness of a concept not implemented yet. A desktop study carried out showed that there are some games supporting different elements of this concept, but we did not find any game aiming at supporting the understanding of a paradigm shift.

Practical impact and limitation:

This paper discusses under which circumstances it seems appropriate to use serious games. The implementation of the Intelligent Cargo concept leads to the adoption of advanced ICT and the use of technical devices. A correct handling and operation is very important for the efficiency of the solution, but developing a computer based game in which the user can apply and use the devices, will be too costly and probably inefficient, thus the paper discusses when to use computerised and non-computerised games as well as the limitation of the use of serious games.

Keywords:

Serious games, Intelligent Cargo, Supply Chain networks

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CASE STUDY ON IT OUTSOURCING BY A LOGISTICS SERVICE PROVIDER – AN INTROSPECTION OF THE OPPORTUNITIES AND CHALLENGES FACED

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ABSTRACT

Purpose:

Outsourcing has become one of the defacto standards of managing business by many organizations. In logistics industry this is the name of the game. Traditionally only shippers were outsourcing their logistic needs to LSPs (Logistics Service Providers). By which these LSPs would manage the shipper's end to end logistic needs. These things happened because shipper's wanted to reduce their operational costs.

As the LSP industry evolved these LSPs also started focusing on cost reductions and also evaluated outsourcing as an option. LSPs found that IT as a function which can be outsourced since they didn't want to build competence in a non core area. In simple terms IT is to LSP what Logistics was to Shippers that is non core functions in their organization's value chain.

The LSP Organization presented in this Case Study decided to go for Outsourcing of its IT needs since IT was a more a burden than being a beneficiary. Its IT setup was highly fragmented and was very out dated. Due to which its IT setup was unable to cope with its newer operational offerings to its clients in short its IT lacked the required Scalability and Flexibility.

The LSP Organization went through a rigorous selection process identified a vendor to whom it offered the Outsourcing Contract for its IT.

Research approach:

This is a case study and it is based on the project experience with an LSP

Findings and Originality:

The content shared is purely based on the Project Experience with the LSP who is our client. And all statistics are purely original and there would be no reference of whatsoever nature.

Research impact:

This paper details and explains the Outsourcing Model, its Process and its background. It also explains the pros and cons of the approach adopted in this Outsourcing Project.

An LSP Outsourcing its entire IT is a new breed in the LSP Industry. More such outsourcing engagements would happen as this model gets established in the LSP Industry. This help academia understanding the dynamics of IT outsourcing in the LSP Industry

Practical impact:

This serves as an eye opener for future outsourcing organizations operating in the logistics space.

Keywords: LSP, Systems, IT, Logistics

TOWARDS THE EXTENDED ENTERPRISE: CLARIFYING PARADIGMS AND CONCEPTS IN SUPPLY CHAIN MANAGEMENT

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ABSTRACT

Purpose: Although business interest in the concept of Supply Chain Management (SCM) has augmented since the 1980s when companies first recognised the gains of collaboration inside and outside their boundaries, SCM has been ill-defined, and there is no consensus on what the term means (e.g. Mentzer *et al.*, 2001). Moreover, to reflect the way organisations deal with their customers and suppliers and the subsequent level of integration necessary for competitive advantage, within the Supply Chain (SC) theory development the paradigm shifts of the Network metaphor and, more recently, the Extended Enterprise (EE) have emerged.

Nevertheless, evident is in the literature some confusion in defining the SC collaborative structure relevant to the EE and in defining the EE as a concept itself. There are several concepts closely related to the EE, and confusion may also arise when some authors advance similar concepts under different names, such as the Virtual Enterprise (Tonchia and Tramontano, 2004). Moreover, only recently, Bititci *et al.* (2005) suggested that "although the concept of SCM has gained significant acceptance in industry, other concepts, such as EEs and Virtual Enterprises have remained as academic concepts with no real industrial and commercial application". However, the literature does provide examples of EE's formed in several industries, such as the automobile, aerospace and locomotive one. Hence, such a statement by Bititci *et al.* (2005), alongside the previous discussion, indicates the need to further explore the field of SCM and the EE, and to develop a current understanding of the evolutionary and definitional aspects and practical issues surrounding such collaborative SC formations.

The purpose of our paper is to identify the important paradigms in the SCM theory and practice, and how they relate one another. Moreover, the paper aims to develop a more complete understanding about the different paradigms and concepts of the SC collaborative forms, and in particular the recent paradigm shift of the EE.

Design/methodology/approach: An extensive literature review facilitated this research. Our paper reviews seminal and extant theoretical developments in the field of SCM, and identifies, defines and critically contrasts and compares the relevant emergent paradigms.

Findings: The paper provides a review of the evolution of SCM theory and practice and its pinnacle, namely the EE, as well as clarifications among the main SCM paradigms and concepts. Our literature review also assists in identifying gaps in the existing knowledge that could be used for the emergence of future research questions.

Originality/value of paper: This is a literature-based paper that reviews and clarifies the important emergent concepts in SCM paradigms, and is relevant to both academics and practitioners.

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SECTION 2 – Supply Chain Inter-Firm Networks and Collaboration

WE SELECT GREEN – CASE STUDY OF THE NIKO TRANSPORT D.O.O. COMPANY

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ABSTRACT

The operational efficiency of the transport-logistics chains is affected by all actors involved: linear companies, port authorities, stevedores, forwarders, agents as well as of the level of integration of hinterland transportation modes.

At the moment, only the company Niko Transport d.o.o. offers the intermodal way of transport in Slovenia. The new strategy of the company was named »We select green«. Its main goal is the same effect with lower pollution. They understand they are part of whole logistic chains for which it is typical to become more and more sensible to the demands that concern the protection of the environment. That is also one of the priority strategies of the EU. Launched in the Freight Transport Logistics Action Plan, Green Corridors support today the EU's agenda towards decarbonising transport while emphasising the need for efficient logistics.

Niko Transport d.o.o. is a Slovenian transport company, which was established in 1990. All of their trucks, which are one to one and a half year old, meet the ECO standards and are equipped with a CVS Mobile tracking navigational device that enables the customers to track them over their web page. Because they understand transport as a part of the whole service, they developed a partner relation with their customers and also with the contractors.

The targeted market of the Niko Transport d.o.o. company is centred to the EU market. Scandinavia and Spain were already tested as well as southern markets down to Greece. Not long after they started the business they found themselves on the UK market with which they make 40% of their traffic. They are connected with their partner Anglo Overseas from Glasgow and with the introduction of the multimodal transport, with their new partner the TPC Freight Management.

The goal of the article is to present the business of the Niko Transport d.o.o. company on the UK market, the introduction of the multimodal transport, the approval of the Marco Polo project, the selection of courses and partners. A research of the students of the Caledonian University of Glasgow as a part of the project is also presented in the article.

STABILITY OF LOGISTICS NETWORKS WITH VARYING CAPACITY OF NODES SUBJECT TO TIME DELAYS

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ABSTRACT

Purpose of this paper:

Modelling of logistics networks and supply chains is of high interest for applications. Mathematical models provide an opportunity to simulate a logistics system to investigate its properties like performance, stability, robustness and to design appropriate controls to improve these properties. However analysis of such networks is a hard and challenging problem due to complexity of logistics systems. Such networks are large scale interconnected systems with a nonlinear behaviour, moreover they are subject to internal and external perturbations that can destabilize the network and lead to a decrease in performance or a brake down. Due to the complexity such systems are hard to analyze and to control. A decentralized control is in many cases the only one possibility to keep its running. Such basic properties as stability and robustness against disturbances must be assured for a reasonable behaviour of the system. The purpose of the paper is to provide a generic example of a logistic network to derive a mathematical model for it and to show how its stability can be investigated. Stability conditions will be explicitly derived.

Design / methodology / approach:

Since reactions on changes happening in the system and due to the disturbances are usually delayed in time we will use a differential equations with time delays in our approach. By dynamics of the network we consider the change at the stock level of logistic locations. This change is caused by the own production and by the flow of material from/to other locations. As the locations are situated usually far from each other the flow arrives with some time delay. Roughly speaking we call a logistic network stable if the stock level of each its node remains bounded for all times and it is robust against disturbances (seen as external inputs) if this level depends only of the magnitude of the disturbance. This is the desired properties that we going to assure in logistics networks. To this end we will work in the framework of input-to-state stability (ISS) that is very appropriate for investigation of interconnected nonlinear systems [1], [2].

Findings:

The paper derives a mathematical model that can be used for modelling of production networks or supply chains and states a general stability criterion for its stability. An example shows the implementation of this criterion for a specific scenario. The meaning of the criterion will be interpreted in a logistics sense.

Practical implications:

Our stability conditions imply restrictions on the production or processing capacities for the nodes of a network to perform stable. These restrictions should be used in the design of logistic and supply networks. Our approach can be used for large scale networks with arbitrary topology.

What is original / value of paper:

One novelty of the paper is a new modelling approach that can be used for supply chains or a more general kind of logistics networks. Another novelty is derivation of concrete stability conditions that are important for design of such networks, since they assure a reasonable behaviour of the network.

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CURRENT ISSUES AND CHALLENGES OF CONTAINER SECURITY DEVICES IMPLEMENTATION IN SUPPLY CHAIN NETWORKS

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ABSTRACT

Purpose:

The research and business interest to the topic of security enhancement in container supply chains dominated over the last 8 years. At the same time the stakeholders looking for the solution not to overload the trade lines with additional security related expenses. Many alternatives based on smart container security devices (CSDs) and electronic seals have been examined and extensively tested since 9/11. Nevertheless, undefined electronic seal's status on the world market and manipulations with international standards for such devices involve many discussions about when, how and what type of seal will be most effective and secure for container logistics purposes. The debates take a long time and there are still no solutions or trade-offs between customs authorities and business sector, between manufactures of e-seals and standardization institutions regarding technical capabilities of security devices and logistics applications of it. For that reason, this research has a purpose to investigate current issues and to classify the coming up challenges and solutions for worldwide implementation of CSDs in the container supply chain networks with the aim to enhance the security and safety of container transport systems.

Research approach:

This research will rely on the literature and case studies reviews and therefore will have an exploratory nature.

Findings and Originality:

The paper discusses different implementation stages of CSDs (electronic seals, smart container devices etc.) in supply chain networks with special focus on the improvement of security issue in container system. The existing issues and challenges for CSDs involvement in the general process of container transportation are listed in this paper.

Research impact:

The paper presents an overview of existing case studies and research projects of CSDs implementation in real supply chains. This paper proposes the investigation of operational issues in the sphere of new technology implementation in the complex supply chain networks. Moreover, the research lists the challenges for CSDs' implementation on the local and global levels of usage in supply chain networks.

Practical impact:

The paper aware decision-makers, operating in the complex supply chain networks, about different kinds of challenges they can expect during the implementation of innovative CSDs in global container networks.

Keywords:

Container security devices, e-seals, supply chain security, container logistics

RAPID EXPANSION CAPABILITY AND EFFICIENT MANAGEMENT IN DE-CENTRALIZED SME SIZED MANUFACTURING COMPANY

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ABSTRACT

Earlier, in SME companies the focus has been mainly on capacity allocation and production planning, not so much on flexibility, anticipation and prepared processes. Nowadays many SME are considered to be quite flexible, but somewhat area / location constrained. As such there has not been a need for understanding of centralized management and steering of decentralized business units on SME level. In this case study a new operational model (in SME company size) was found, that allows rapid business expansion and efficient resource allocation over decentralized production unit network. The model is based on a concept of (possible) firm acquisition, management streamline process, worker acquisition and re-education, working method modernization, centralized production steering over the whole factory network for efficiency maximization and efficient resource allocation.

This model allows profound partner relationship, in which the partners have shared goals and decision-making processes aiming at mutual strategic benefits. Nowadays the focus on SME has been diverted from plain capacity allocation to flexibility and anticipation, but typically SME are still limited on resources to change their company structure to reflect changes on main suppliers' side.

Lately, these limitations have been clear, in cases where the main supplier expands operations on distant locations (e.g. other countries). This research case reports an subcontractor business growth model, that goes around of the limitations and as a model is considered to be unique, considering the size of the sub-contractor.

THE SUPPLY-SIDE OF THE E-GOVERNMENT IMPLEMENTATION: AN ANALYSIS USING DEMATEL METHOD

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ABSTRACT

Purpose

There are evidences that the developing nations face a number of challenges while implementing electronic government (e-Government). The purpose of this study is to investigate the critical factors associated with the supply-side of the e-Government implementation in Bangladesh.

Design/methodology/approach

A framework for the e-Government implementation from the supply-side perspective has been proposed. It is consisted of nine factors and three higher-level constructs. Data were collected against these factors using 24 respondents who belong to four categories of organisations such as government policy makers and public officials, development partners, implementing agencies, and ICT task force members. The Decision-Making Trial and Evaluation Laboratory (DEMATEL) method was used to identify the critical factors of the e-Government implementation and the causal relationships between these factors.

Findings

The results indicate that from the supply perspective the major concerns for e-Government implementation are security, technological issues, and regulatory framework, whereas, the main drivers are political commitment, administrative leadership, and resources. Political leadership directly influences the administrative leadership, funding provision, development of regulatory framework, and privacy issue regarding e-Government implementation.

Research implications – The study suggests a framework for e-Government implementation from the supply-side perspective that will help policy makers to assess the factors of e-Government. The findings provide insights into the criticality of the factors and assist decision makers to develop a strategic action plan for proper e-Government implementation.

Originality/value: Previous studies in e-Government were conducted mainly using case study methodology and qualitative approach. This is one of the rare studies which apply a quantitative approach using data from four categories of stakeholders. The findings of this study can be applied in other developing nations.

Keywords – Critical factors, e-Government, DEMATEL analysis.

Paper type- Research paper

EURIDICE PLATFORM ARCHITECTURE FOR PRO-ACTIVE AND AUTONOMOUS LOGISTICS OPERATIONS

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ABSTRACT

Purpose of this paper

As a result of the EU-FP7 funded research project EURIDICE (European Inter-Disciplinary Research on Intelligent Cargo for Efficient, Safe and Environment-friendly Logistics - FP7-ICT-2007-216271) which deals with the research on autonomous business processes for logistics and supply chain management the project's consortium developed the architecture for an open, extendable and interoperable platform for advanced information services for freight transportation under the concepts of intelligent cargo. The concepts of intelligent cargo intend to trigger a paradigmatic change in the field of ICT applications for transport logistics. In the EURIDICE vision, Intelligent Cargo connects itself to logistics service providers, industrial users and authorities to exchange transport-related information and perform specific services whenever required along the transport chain. This will produce significant benefits for the logistics industry and for the community.

Design/methodology/approach

The EURIDICE platform is mainly divided into two parts: a fixed part which hosts highly interoperable business-oriented information services realized as a web-service infrastructure and a mobile part, realized as a *intelligent network* consisting of a FIPA-standards compliant Multi-Agent System representing single cargo-items in the field using mobile devices attached to cargo-items, containers or vehicles.

The development of the EURIDICE platform is supported by several pilot applications hosted by different European enterprises dealing with different typical scenarios in the field of logistics like: intermodal transports, sea-freight and port-handling, automated clearance and billing, cold-chain controlling etc.

Findings

The EURIDICE architecture is tailored to seamlessly combine the fixed part which offers high level business-services dealing with cargo-centric information- and process management realized as a Service Oriented Architecture, with the mobile part, equipping cargo items with connected hardware devices and sophisticated Multi Agent Software Systems to provide a virtual stakeholder for each single cargo item, representing the interests of the designated cargo item. In addition to advanced reasoning techniques applied to the data gathered by the Multi-Agent system the EURIDICE architecture handles the interaction between the two very different approaches of the centralized Service Oriented Architecture, and the massively distributed and concurrent multi agent system.

Research limitations/implications (if applicable)

The EURIDICE project deals with the logistics domain, namely the transportation sector within Europe. The platform presented in this paper mainly enables the concepts of *intelligent cargo items* and fills the gap between pro-active, autonomous cargo items and higher-level business services applied by enterprises. Future research in this field should elaborate on the applicability of the concepts of *intelligent cargo* for other domains apart from the transportation sector, like the manufacturing, maintenance or product lifecycle management.

Practical implications (if applicable)

The EURIDICE architecture especially takes the interoperability and the role of standards into account to properly serve the diverse field of European logistics. The architecture proposes mechanisms to support different legacy systems used by logistics operators all over Europe, as well as standardized data structures implemented as a semantic framework based on a well suited ontology to offer a common understanding and the basics for advanced techniques for applied reasoning and data analysis on the information gathered and managed by EURIDICE.

What is original/value of paper

This paper shows how different concepts (SOA, Multi-Agent-Systems, Reasoning, Semantic Reasoning) can be tailored to a uniform, transparent and open system. The EURIDICE Architecture aims to exploit all the advantages of these different technologies to properly handle the enormous requirements regarding openness, robustness, scalability and maintainability.

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INTERNATIONAL LOGISTICS AND THE SINGLE WINDOW CONCEPT

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ABSTRACT

This paper provides a review of the "Single Window" concepts (UN/CEFACT 2004) and related electronic infrastructure for the sharing of trade related data between business and government stakeholders in international logistics operations. As such, the paper outlines key principles, operational requirements and the wider policy context. Much of the current policy momentum towards developing single window type infrastructure can be associated with commitments made by governments – for example at the WTO (WTO 2007) or within ASEAN (ASEAN 2005) or the EU (TAXUD/477/2004) – towards enhancing trade competitiveness. However, the single window concept is also of equal relevance to reform initiatives driven by supply chain security considerations (e.g. WCO 2007). The research presented in this paper builds on a technical note produced by the author for the World Bank. The paper's aim is to expand on the current literature (e.g. Applegate, Neo et al. 1995; Teo, Tan et al. 1997; Wulf 2004; Linington 2005), provide a taxonomy for public electronic infrastructure in cross-border operations, outline associated border management reform challenges as well as map out possible paths for their resolution.

Purpose of this paper

To share unpublished research produced for the World Bank. Introduce the topic of electronic trade systems and the single window to the wider logistics community. Provide the foundation for an active research agenda

Design/methodology/approach

Desk based review.

Practitioner observations gained while working on single window related policy in the UK and EU whilst serving as Deputy Director at SITPRO, the UK trade facilitation agency. Practitioner observations gained while working on the UK single window project. Interview and observation material collected as part of the author's award winning PhD research. Feedback and peer review received from the World Bank and other practitioners

Findings

The development of a taxonomy. Overview of relevant policy initiatives. Discussion of implementation obstacles and overall reform limitations. Overview of possible paths (and research directions) for overcoming obstacles

Practical implications (if applicable)

Investment into single window type infrastructure is likely to be in the order of hundreds of millions of dollars in each of the world's major trading nations. A better understanding of the single window concept and implementation problems is likely to reduce spend as well as the risk of project failure. Much of current single window thinking fails to fully consider the recent innovations made in web-based technologies. Some technological innovations, such as cloud computing, are strong contenders for overcoming implementation obstacles and deserve to be more actively considered.

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ICT INTEGRATION IN FACILITATING GLOBAL LOGISTICS AND TRADE: Analysis of Initiatives from TAIWAN'S GOVERNMENT

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ABSTRACT

International trade plays a major role for some nations to their national economies, especially for those export-oriented nations. In order to promote international trade, these governments have put a lot of efforts to simplify transport operations, reduce customs barriers and harmonise import/export processes. The paperless trade and Information and Communication Technology (ICT) are widely used in the governments of these nations.

In Asia-Pacific region, the implementation of paperless trade program was declared by APEC (Asia-Pacific Economic Cooperation) Ministers in 1998 for the purpose of facilitating international trade. Since then, most of APEC member economies have prepared their individual action plans to paperless trading implementation. They believe that cooperation among them is needed in cross-border situation and a commonly accepted trading practice should be worked out and be followed to make the cross-border process more seamless and consistent.

As the Information and Communication Technology (ICT) has rapidly developed in the last two decades and high speed transmission solution with the mobile/wireless telecommunications is popular and advanced, multi-national enterprises successfully provide global logistics service through the use of this technology in the global supply chain. Examples are found in shipping companies doing global networking with their world wide agencies, local offices and regional companies. Some of them even relocate their information centres in other countries providing 24 hour and 365 day services for their customers. More than that, the development in IT, EDI and Vans had played an important role in facilitating global logistics and trade, and the Internet solutions are replacing the uses of EDI over VANS.

The objectives of this paper are first to identify the varieties of international trade procedures in a government; second objective is to focus on government efforts to reduce trade barriers and third to identify the role of Information and Communication Technology (ICT) in improving efficiency and effectiveness of global logistics and trade.

In order to understand the role of ICT implemented in the government for E-Trade implementation to facilitate global logistics and trade, we analyse the trade procedure in governmental sector step by step. The areas analysed include transport operations, customs clearance and import/export processes. Thus, this paper identifies obstacles in E-Trade, study various standards of doing E-commerce and evaluate development of E-Trade, so as to establish the current situation of E-Trade and the best practice in paperless trading.

The case studies of local Van providers in Taiwan, such as FISC (Financial Information System Company) and Trade-van, are used to help examining how these systems assist in facilitating global logistics and trade. Other necessary systems for import/export processes are also examined. The output of this research sets an example for the governments of other countries with similar drive for international trade facilitation.

SECTION 3 – Supply Chain Performance Assessment

WHAT IS THE TRUE TOTAL COST OF OUTSOURCING OF SUPPLY CHAIN PROCESSES? A SERVICE QUALITY PERSPECTIVE

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ABSTRACT

Purpose of this paper

As companies now compete on a global basis, geographical dispersion of business units and processes has become commonplace. Furthermore, outsourcing has become an important source of competitive advantage for many firms, owing to the projected long term cost savings that can be achieved by moving high overhead activities to a low cost location. However, further down the line, are the benefits realised as anticipated?

The ever-increasing options open to outsourcers regarding suppliers, location, transport methods and communication technologies mean that the questions of what, where and how to outsource remain key topics in management research (Hätönen and Eriksson, 2009, McIver, 2008). Cost benefit analyses are one of the first tasks carried out by would-be outsourcers. However, can all of the costs be accurately assessed? By means of a longitudinal study, carried out over a period of five years, this paper examines this much-discussed topic by focussing on contributing success factors. In particular, we analyze the main service quality dimensions, practical customer service issues and management implications of outsourcing of key business processes (such as manufacturing, logistics and IT) in manufacturing organisations.

Transformation of operations contains much uncertainty and risk. For example, studies have shown that 50% of outsourcing relationships fail within the first 5 years (Dun and Bradstreet, 2000). There have been a number of approaches to tackling both the transitional and long term issues raised by outsourcing. Here we have chosen to focus on service quality, as this is a major determinant of customer service. It is also an area where hidden costs can lie.

Design/methodology/approach

Following an extensive literature review, gaps regarding research into the management of outsourcing relationships, particularly with respect to customer service were identified. Our overall aim was to explore outsourcing relationships in the manufacturing industry from a customer service perspective and to provide a relationship management framework to assist organizations to attain sustainable relationships with outsourcing partners. Our specific objectives were to determine whether cost savings had been realised, examine the factors that influence and contribute to service quality in an outsourcing relationship and evaluate how experience shapes future outsourcing strategy.

Results from 107 questionnaires (3% response rate) and 15 interviews that investigated service quality from the outsourcer's perspective were analysed to assist in the development of a relationship management framework.

Findings

Our research revealed that the majority of companies felt that expected outsourcing benefits were not fully achieved. The most influential factors affecting outsourcing relationships and service quality were found to be cost realisation, consistency of quality, trust building, communication and responsiveness. Of these, trust building and ongoing close collaboration with outsourcing partners was found to be key to maintaining successful outsourcing relationships. They were also crucial to keeping long term running costs under control.

The resulting relationship management framework seeks to ensure that all service quality aspects are considered, prior to the outsourcing decision being made. Elements include practical supply chain issues (e.g. supplier capability, lock in effect), management issues (partner selection, information sharing), quality issues (complaints, costs) and cultural issues (managing differences).

Research limitations/practical implications

This research has highlighted that in order to ensure that in order for outsourcing relationships to be successful in the long term and for cost-benefit forecasts to be realised, firms must maintain open channels of communication and high levels of trust.

Our research indicates that outsourcing success is linked to appropriate use of service quality, blended together with strong customer service considerations. The barriers that can result from (mis-)communication have to be addressed and managed at the earliest stages if outsourcing is to become successfully integrated into the organisation's culture and processes. Furthermore, to ensure that communication channels remain open, additional incentives such as Communities of Practice should be encouraged.

As the relationship management framework was developed with companies in the manufacturing sector, additional testing (in particular empirically-based comparative studies) in other sectors is desirable to enhance its validity. Furthermore performance measures need to be further developed and tested.

What is original/value of paper

This framework, together with the suggested measures and implementation methods, paves the way towards developing practical and realistic solutions for ensuring a sustainable, long term outsourcing culture within organisations.

Type of paper - Research

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A MODEL FOR SUPPLY CHAIN VISIBILITY ASSESSMENT

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ABSTRACT

Purpose

The objective of this paper is to analyse Supply Chain Visibility (SCV) which is ill-defined and to provide a mathematical model of SCV so as to assess it objectively for supply chain performance improvement.

Design/methodology/approach

A literature review has been conducted to understand the meanings of the extensively used jargon of supply chain visibility and current its assessment methodologies. The characteristics of SCV have been conceptually analysed and a mathematical model based on metric entropy for it has been proposed to provide a novel method for assessing SCV.

Findings

SCV is a unique expression specific to the field of supply chain management and logistics. Currently, there are various subjective methods of which focus on its importance by assessing its benefits and impacts from different perspectives mainly based on judgements gained from people. There is a need of an objective method to quantify SCV for supply chain performance improvement as SCV is a new factor for supply chain performance management. Furthermore, a mathematical definitions and a measure space for SCV are able to describe SCV formally based on the characteristics identified in this paper. Several possible research issues have been identified for future research as well.

Research limitations/implications

We acknowledge that our study is limited, and that not all the relevant sources have been taken account. The present study provides a starting point for further research on SCV assessment.

Practical implications

A model for assessment of SCV is beneficial to supply chain professionals to clearly communicate about SCV which is a critical issue for many companies keen to operate in an end-to-end environment.

Originality/value

The model for assessment of SCV presented in this paper is comprehensive and novel. It helps model and assess SCV for better supply chain performance assessment. Furthermore, the extension of entropy to SCV is a significant contribution to the research community to formally conceptualise SCV.

Keywords Supply chain visibility, Supply chain visibility assessment, Supply chain performance assessment, Entropy

Paper type Conceptual paper

TOTAL QUALITY MANAGEMENT AND CONTINUOUS PROCESS IMPROVEMENT OF ENGINEERING PROJECTS: A PHENOMENOGRAPHICAL STUDY OF A SEMICONDUCTOR MANUFACTURING FIRM IN MALAYSIA

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ABSTRACT

Purpose of this paper

In the last two decades, Total Quality Management (TQM) has won considerable attention from both industry practitioners and academics. TQM has become progressively more popular as organizations focus more on improving the quality of their products, services and internal operations to increase value to customers and gain competitive advantage. Therefore, the purpose of this paper is to analyse these TQM components in a semiconductor manufacturing firm in Melaka using a phenomenographical approach based on the experiences of the project leaders to determine how TQM contributes engineering performance.

Engineering project work requires the capability to efficiently manage in accordance with "hard" and predictable processes that prescribe the work as it is planned to be done, while at the same time being compatible with the "soft" and unpredictable processes that are often in contradiction with the former (Zika-Viktorsson & Ritzen, 2005, p. 198). Efforts to develop work methods, processes and routines have always been a part of work life and today, it is possible to discern an emphasis on co-worker participation in activities, aimed at the continuous improvement of work methods and work design, as a means towards development, learning and better goal fulfillment in organizations (Zika-Viktorsson & Ingelgard, 2006, p. 103). It is undeniable that TQM has had a profound and unparalleled impact on modern business history and landscape (Prajogo & Hong, 2008).

Researchers also believe that there has been little attention paid to employee perceptions of (or satisfaction with) TQM programmes, even though the strategic management of human resources is adequately emphasised in optimizing TQM performance. Based on the extant literature, the perspectives of the people involved in TQM have more often than not been sidelined. As such this study aims to obtain a better understanding of the experiences and thoughts of engineering project leaders who are the nexus between the management team and workers that has not received adequate coverage in the engineering management and supply chain management literature.

Hence, the research question identified for this study is:

How do the human, managerial, technical and contextual aspects of a semiconductor manufacturing firm as experienced by engineering project leaders affect its TQM effectiveness and engineering performance?

Design/methodology/approach

Based on a phenomenographical analysis of interviews with engineering project leaders of a large semiconductor manufacturing firm in Melaka which has implemented TQM for over 5 years, we identify different layers of understanding by focusing on the referential objects and the structural components of TQM and its role on engineering performance. Due to the abundance of quantitative and grounded theory approaches to the study of manufacturing processes, this study employs the use of phenomenography to canvass the alternative views or the structures of individual thought-models of project leaders (Marton and Booth 1997). This is because phenomenography allows for the creation of a hierarchical structure of thought models due to the variation in the richness and versatility of some thought-models uncovered during the interview process. Phenomenography in essence is about individual meaning construction which results in a conception referring to conceiving and understanding

something. This would therefore enrich our understanding of the phenomena which has been more often than not aggregated in the form of surveys and mean averages, therefore neglecting the 'voice' of the individual at the ground.

Guided by an interview protocol, the researchers interviewed a total of ten experienced project leaders for approximately 45 – 90 minutes each on how TQM influences the manufacturing firm's engineering project performance based on their individual project management experiences. These respondents were selected for the interview based on their project leadership experience and tenure in the firm. All respondents were assured of the confidentiality and anonymity of their responses and the intent of the interview and research. The interview session was recorded using a voice recorder and later transcribed for analysis using NVIVO 8, a qualitative analysis application to identify the emerging codes and themes. Based on this analysis, the findings of the study are presented in the next section.

Findings

Several key themes with regard to the issue of TQM implementation in the firm emerged from the interviews with project leaders. Among all the TQM variables, management leadership can be said to be the most influential variable as the total commitment and management support is essential for the success of TQM implementation is consistent with that of the study from Reed et al. (2000) and Fazli Idris and Khairul Anuar Mohd Ali (2008). The firm's policy in meeting and exceeding its customer expectations is consistent with the findings of Jung and Wang (2006) who suggest that top management's commitment to quality through the firm's vision and strategy, organization-wide quality culture and objectives for quality performance will ensure the success of its continuous improvement projects. In TQM, it is not only about creating new products but also improving the quality of existing products in manufacturing firms (Prajogo & Hong, 2008). This is clearly true for this particular company as it focuses on developing and manufacturing existing products.

What is original/value of paper

This exploratory study provides preliminary evidence of a phenomenographical study which confirms that TQM highly influences project performance in a positive way and that organisations need to heed the delicate mixture of human, managerial, technical and contextual issues inherent in the firm when implementing their TQM programmes to ensure that they are met with positive outcomes. This finding is of value to managers and policy makers within the firm to appreciate the viewpoints of engineering project leaders when making policies and decisions.

Topics: Supplier Involvement in Product Development, Supply Chain Management, *Supply Chain Performance Assessment*

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KEY FACTORS INFLUENCING THE EFFECTIVENESS AND EFFICIENCY OF SUPPLY CHAIN MANAGEMENT IN SMALL AND MEDIUM ENTERPRISES (SMES) IN MALAYSIA

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ABSTRACT

Over the last decades, Supply Chain Management (SCM) has become an important topic among manufacturing companies and academic researches to achieve a competitive advantage. In addition, getting better effectiveness and efficiency performance of SCM requires study on the main significant indicators which are affecting the performance of SCM. This paper discusses the key performance indicators (KPIs) that resulted from a questionnaire survey method and interview in SMEs of Malaysia, both quantitative and qualitative analysis has been done as well. The study revealed that on time delivery to the customer, product quality and service, and customer satisfaction in fulfilment of orders were the most important factors relative to successful supply chain processes. In addition, top management decision has been identified as the highest barrier to implementing supply chain management in the automotive sector. Also this paper would be beneficial to all managers in implementing the SCM in Malaysia.

Design/methodology/approach

A survey was conducted using questionnaires amongst dozens of managers and directors of production and operation department in various supplying and manufacturing companies and a quantitative evaluation was done to indicate the most important factors challenging effectiveness and efficiency in implementation of supply chain management in SMEs in Malaysia.

Findings

The study provides a set of factors and identifies the most significant influencing the effectiveness and the efficiency of supply chain management in small and medium scale industries in Malaysia.

Research limitations

The factors and results are based solely on literature review and survey conducted.

Practical implications

The study provides supply chain managers in Malaysia, factors which must be given prior attention in order to achieve an effective and profitable supply chain management in SMEs.

Type of paper -Research paper

Keywords - Supply chain management, Key factors, SMEs, Performance indicators.

SECTION 4 – Risk and Visibility

RISK PROPAGATION MODEL FOR A DEFENCE FOOD SUPPLY CHAIN

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ABSTRACT

Purpose of this paper

Supply chain disruptions in the military food supply chain can hamper the ability of the army to operate and to defend the nation. Military food supply chains like other commercial supply chains are susceptible to shortages and delays due to natural disasters, manmade attacks and other risks. Understanding risk management and ensuring the safety of food as it moves within the supply chain is as critical as the on-time delivery and low cost procurement of food for the military. Previous studies (Zsidisin et al., 2000; Steeld and Court, 1996) have been conducted to understand the risks that can affect the supply chain. The method adopted in our study to categorize the supply chain risks is to distinguish them into risks which arise within the supply chain (operational risks) and risks which arise outside the supply chain (disruption risks). Operational risks usually refer to risks which arise from uncertain demand, uncertain supply and uncertain costs. Disruption risks arise due to manmade and natural disasters such as earthquakes, floods, tsunamis, hurricanes and terrorists attacks. Followed by a analysis of the risk factors specific to the military supply chain, we develop a stochastic risk propagation and risk management model. The model provides methods to combines risks that occur simultaneously as well as demonstrate a method to solve the correlation problems which arise when risks are interrelated to each other.

We also explore mitigation strategies such as substitution of food products, safety stocks and near shoring and multi sourcing and incorporate these into the food supply chain risk mitigation model for the military.

Design/methodology/approach

After conducting a thorough literature survey covering studies related to Supply Chain Risk management and food supply chains, qualitative insights about the perceptions of food supply chain risks were collected by conducting interviews and surveys with local food suppliers. Quantitative models (Lonsdale, 1999) for risk management were also studied. Then stochastic risk propagation and mitigation models were developed using the qualitative interview, survey data, and historical data.

Findings

The main contribution of the paper is the development of a stochastic risk propagation and management model within the context of the military food supply chain.

What is original/value of paper

Based on data using from surveys and historical events, the paper presents a model that analyzes risk propagation and management in the food supply chain for the military. The model provides the basis for a decision tool for the military and helps them in selecting the best solution where risk is minimized while obtaining optimum costs and lead times. It analyzes historical as well as current data to obtain a mathematical solution which can be used to understand the risk factors and their impact on the military food supply chain.

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ASSESSING RISKS, THEIR VISIBILITY AND CONTROL IN MARITIME SUPPLY CHAINS

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ABSTRACT

Purpose:

Supply chain disruptions have become a critical issue for many companies, and supply chain complexity and disintegration are emerging as major challenges in supply chain risk management. The ability to identify risks has decreased as the control and visibility of supply chain operations have fallen to the hands of outside service providers. The risks, their visibility and their impact depend on the position of the companies in the supply chain and on the level of analysis companies can carry out. In this paper we present preliminary research concepts and findings concerning the identification and analysis methods of supply chain risks as well as risk management control between supply chain members.

Research approach:

The study is based not only on the literature concerning supply chain risk management but also on the findings from interviews conducted. In order to tap into the supply chain professionals' experience and knowledge, a discovery-oriented approach was applied with semi-structured interviews as the primary method of data collection. The data was verified following the Delphi method in group discussions.

Findings and originality:

The paper provides a holistic view of maritime supply chain vulnerability, risk visibility and control and a method for their assessment. It illustrates how the level of risk management varied highly between the organizations interviewed in the focal supply chain. The risks facing the supply chain were not recognized by many of the smaller companies, whereas the global logistic operators clearly seemed to benefit from the visibility of the chain. The conceptual understanding and comprehension of risks also varied highly between the interviewees. The paper furthermore shows that supply chain risk management applications are still in their infancy and there are great differences in the companies' willingness to introduce them in the chain and enhance co-operation.

Research impact:

Even though there are several studies on supply chain risk management in the current literature, only a few of them address the maritime supply chain perspective. This paper contributes to that gap by assessing supply chain risks holistically in the maritime supply chain. Furthermore this study shows how co-operation is important in the supply chain context as the visibility of the risks and their control mechanisms do not necessarily reside in the same company.

Practical impact:

Many of the risks facing the supply chains could be mitigated by co-operation and proper supply chain risk management. Some of the companies had attempts to introduce them, but a lack of trust seemed to prevent deeper co-operation which usually stayed only on the necessary level. Practitioners will benefit from the study conducted because it helps better to understand the value of supply chain risks and their assessment. In order to understand all the benefits from increased co-operation further studies should be conducted.

Keywords: Maritime supply chain, risk assessment, vulnerability, visibility, control.

METHODOLOGICAL REVIEW OF SUPPLY CHAIN RISK MANAGEMENT RESEARCH

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ABSTRACT

Purpose of this paper

Supply chain risk management (SCRM) is an emerging research area in the 21st century. The purpose of this paper is to investigate the status of SCRM research in the last 10 years from the standpoint of methodologies applied, and to discuss implications for future research. The empirical evidence used is based on a sample of scientific papers mainly found in the ABI/INFORM database which were published between 1999 and 2008. The status of research is assessed by examining research methodology, level of research issue, research design applied, contribution, main theory applied, and country of the first author. SCRM research is at the early phase of evolution. To take the next step in the evolution process, the discipline of SCRM needs more theoretical contribution based on empirical data collection and rigorous research process, rather than practical conceptual framework only based on desk work.

Design/methodology/approach

There have been several frameworks found for categorising research methodologies which have been applied to methodological reviews and analyses. The framework for research methods developed by Meredith et al. (1989), Meredith model, has two dimensions that enable categorization of research methodologies: the rational versus existential structure of the research process and the natural versus artificial basis for the information used in the research.

The literature about SCRM consists of scientific papers, conference articles, dissertations and a few reports. The prime source for presentation of new knowledge is scientific journals (Paulsson, 2003), so only papers published in English scientific journals are considered in our research. All the full text scientific papers in the database of ABI/INFORM with "risk" and "supply" in their titles from 1999 to 2008 were downloaded, read or browsed, and analysed. Based on the clues (only abstracts) from ABI/INFORM, full text papers also have been found in Science Direct and Business Source Premier (BSP) databases. Except "risk", similar searches also use uncertainty, vulnerability, security, or reliability as the keywords. Owing to the fact that there is a large quantity of papers published in the area, we are unable to review all extant papers in our research. We delimit ourselves to the scientific papers which focus on risk management of supply chain and have "risk" in the titles. The sample can express the status and trend of SCRM research.

Findings

The development of a new discipline like SCRM is based on the usage of concepts, definitions, theories, rules and principles from other disciplines (Sachan and Datta, 2005). SCRM is the intersection of supply chain management and risk management theory. Supply chain is an authentic complex system due to its characteristics of multi-entity, multi-link, cross-region and compound structure, is easy to be affected by the unfavourable factors both from the outside environment and from the entities in the chain. It is necessary to borrow theories and tools from other discipline, or to innovate new theories and methods. But at present, typical theories and methods from other discipline are applied in very few papers. Among the potential approaches to SCRM, holistic approach is hopefully the effective way to theory generation and management practice. Hence, the findings will facilitate future research by adding to the understanding of the characteristics and applicability of methodological choices.

Research limitations/implications (if applicable)

The sample of papers reviewed only consists of 81 papers mainly found in ABI/INFORM database, many of our analyses are based on subjective assessment. These are the limitations of the research. But we are confident that status and trend of SCRM research indicated by the analysis are trustworthy.

What is original/value of paper

The number of SCRM papers published over the last 10 years has grown exponentially on a yearly basis. SCRM will continue to be a fertile research area. More and more talent academicians will make their efforts to the research. We hope that our findings would be useful for researchers who wish to obtain a general overview of the discipline in terms of research approaches and to select suitable methodologies for their research work.

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SECTION 5 – Supply Chain Dynamics and Inventory Management

VALUE BASED ORDER PRIORITIZING IN PRODUCTION CONTROL – INTEGRATING CUSTOMER VALUE MANAGEMENT INTO THE LOGISTICS GOAL-SETTING

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ABSTRACT

Customer orders in international supply networks have to be considered individually in production logistics due to their different importance. Hence, a prioritization based on the customer value of each order should be created and released into a production cycle in order to combine production sequences with the ranked customer orders. Thereby, a connection between financial goals by applying the CVM and logistics goals by applying an autonomously controlled concept of production control can be established. Consequently, logistics goals and financial goals can be achieved.

Purpose:

This paper intends to develop a prioritizing model for balancing logistics and financial requirements of customer orders in production control in order to rank different orders based on their importance. The motivation is that customer orders in international supply networks can have different importance due to e.g. various order sizes or customer values. Thus, customer orders should be assessed and treated individually in order to distinct between more or less profitable ones, as creating superior customer value is a key element for companies' success. One approach to evaluate customer orders is the Customer Value Management (CVM). This concept explicitly focuses on the financial impact of a specific customer order and analyzes the corresponding customer value. It aims for a maximum lifetime profit from the entire customer base. However, by implementing the CVM, the logistics goals of a system might be affected. For example, if more important orders are prioritized over less important ones, the overall due date reliability of the company is likely to decrease as the prioritized orders interfere with the planned production sequence. In consequence, the CVM has to be integrated with the logistics goal-setting in order to ensure both: matching logistics goals as well as prioritizing orders due to their financial importance.

Research approach:

One approach in production logistics allowing for an integration of both perspectives is the so-called autonomous product construction cycle (APCC). It applies the idea of autonomously acting smart objects, which are able to route their way through a production process according to their goals. The smart objects decide at each step of production. The idea is to base the decision not only on logistics goals but also on the customer value obtained by applying the CVM. Thus, the logistics goal-setting of each object can be weighted according to the specific customer order's value. For integrating both concepts (CVM and APCC), the aims are threefold: Firstly, logistics goals, financial goals, and their interrelations in production control will be described; secondly, causal relations between the CVM and the APCC will be identified; thirdly, a tool for prioritizing customer orders for a practical application will be deduced.

Findings and Originality:

By treating orders individually, the introduced concept offers a high flexibility. Therewith, matching new requirements for logistics like customization can be improved. However, it has remaining limitations. Identifying relevant characteristics of customer orders is difficult and depends on various factors, which might differ from company to company. These characteristics have to be independent from each other, what cannot be guaranteed, as relations between them might be unrevealed during identification.

Keywords: Production Control, Customer Value Management, Autonomous Product Construction Cycle, Order Prioritization

FUZZY MULTI-OBJECTIVE VENDOR SELECTION FOR JIT PURCHASING

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ABSTRACT

Just-in-time (JIT) purchasing aims at securing an uninterrupted flow process so that the physical stock of raw materials and in-process goods can be minimal. Practitioners have long considered the vendor's ability to deliver in a timely manner as a critical factor during the vendor selection process for JIT purchasing, so as to smoothen the flow of goods. However, in reality, especially for a long supply chain, interruptions in the form of disruptions or delays are often the norm rather than the exception. Hence, in this type of environment, techniques suitable for handling realistic vendor selection decisions under JIT purchasing are needed. This paper utilizes a fuzzy multi-objective approach to deal with the vendor selection problem for buyers practising a JIT purchasing strategy.

To highlight the timely delivery criteria, a soft time window mechanism is incorporated to allow the purchased parts to be delivered within a grace period with a specified penalty function imposed should the delivery fall outside of the grace period. Five vendor evaluation criteria chosen from the extant literature including those of product quality, delivery, product price, geographical location of the vendors, and production capacity of the vendors are used for the selection of the vendors and to determine the associated purchasing quantities. These decision criteria aim to pursue three objectives, namely, minimize the purchase cost, maximize the quality level, and minimize the time-window violation penalty.

The proposed fuzzy multi-objective mixed-integer programming model encourages a buyer to select the vendors capable of providing quality, on-time products which will maximize total profit with the costs of purchasing, quality, transportation, and penalty charges for violating the delivery time window minimised. An illustrative example is also provided to demonstrate the implementation of the time-window model. Our results suggest that the proposed approach is suitable for handling realistic vendor selection decisions under JIT purchasing in a fuzzy environment.

Keywords: Vendor selection; JIT purchasing, Fuzzy sets; Multi-objective programming; Time window

APPLICATION OF LEAN THINKING IN MANUFACTURING: A SURVEY OF SMALL AND MEDIUM-SIZED ENTERPRISES IN CHINA

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ABSTRACT

Purpose:

This paper aims to investigate the current status of leaning thinking application in supply chain management by the small- and medium-sized manufacturers (SSMs) in China. It also explores if there are benefits in the application and the challenges faced by the SSMs in implementation.

Research approach:

This paper used a self-administered questionnaire survey to collect data. Pearson chi-square tests and one-sample *t*-test tests were applied to analyze the data.

Findings and Originality:

The findings suggest that application of lean thinking in China is not widespread. For those firms that have adopted lean thinking, the major benefits obtained are reduction in cost and waste, inventory, labour, and cycle time. The major difficulties encountered are communication between workers and managers, and collaboration with supply chain members.

Research impact:

This study lends insight into current status of lean thinking application in the manufacturing sector of China and the challenges firms are facing. Nonetheless, the low response rate hence small sample size makes it difficult to generalize the results to the whole industry.

Practical impact:

Proper application of lean thinking in supply chain management can bring substantial benefits to the manufacturing industry. The study reports the current status of adoption and identified the issues that the firms have to address. Managers can use this research to benchmark their lean thinking application and revise their supply chain strategy accordingly. The findings may also assist government in formulating policies on promoting application of lean thinking in the supply chain management in China.

Keywords:

Lean production; Supply chain management; Small and medium-sized enterprises; Manufacturing; Waste reduction

ORDER ARRIVAL TIME AND QUANTITY FORECASTING WITH ANFIS UNDER HYBRID MTS/MTO ENVIRONMENT

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ABSTRACT

Sharing information on market, production capacity and inventory statuses is well known to help supply chain members reduce the inventory costs and mitigate the bullwhip effects. However, in practice, many manufacturers still have difficulties in obtaining market and inventory information from their customers due to the lack of trust, not major account, high investment cost, etc. When information sharing is not feasible, manufacturers can resort to forecasting to predict the plausible next order arrival time and quantity so that they can pre-produce to shorten order lead time without carrying excessive inventory.

With hybrid MTS and MTO production systems, manufacturers can benefit by implementing postponement to pre-purchase production parts and / or pre-produce MTS strategy based on the forecasted order arrival time and quantity. In this study, we consider forecasting the next order arrival time and order quantity under the hybrid MTS and MTO production environment when the manufacturer has no information sharing with his customers. Most forecasting systems rely on complicated rules to enhance their accuracy; however, the rules are not simple enough for decision makers to convert them into human intelligence to make a reasonable good forecast. We adopt the adaptive neural-fuzzy inference systems (ANFIS) as the fundamental inference system to infer the next order arrival time and order quantity after training with previous order related information to obtain a fuzzy-inference-system (FIS). As ANFIS can predict the next order arrival time and quantity, manufacturers or suppliers are able to pre-purchase or pre-produce customers' orders to reduce order lead times. To provide decision makers with tractable decision domains and inference rules, we further restrict the levels of fuzzy decision variables to have small amount of fuzzy inference rules. By learning the simple rules provided by the ANFIS, decision makers can still make proper purchase / production decisions by observing the statuses of the supply chain without having to perform the ANFIS.

We experimented with sinusoidal market demand patterns and found that an ANFIS with 10 x 10 rules can have MAPE (mean absolute percentage error) of 1% for order arrival time and quantity as well. By reducing the ANFIS to 3 x 5 rules, the ANFIS can still have MAPE of approximate 15%, which is accurate enough for decision makers to learn the 3 x 5 rules and make decisions without relying on the ANFIS to achieve a reasonable good forecasting result.

Keywords: Make-to-order, Make-to-stock, Hybrid MTS/MTO, ANFIS, forecast

UTILIZATION-BASED SIMULATION FOR ANTICIPATORY CHANGE PLANNING

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ABSTRACT

Material flow simulation is mostly applied for the designing and testing of different control configurations and as a tool for process optimization in logistics systems [1]. Globalization and e-Business are only some reasons for a demand of increasing performances of simulation tools, as the actual simulation tools are not able to handle the resulting dynamics and flexibility. A new application is the utilization-dependent simulation for Anticipatory Change Planning (ACP) of intralogistics-systems¹. The ACP is an appropriate simulation-based concept, which ensures reliable, effective, and efficient operation of such intralogistics-systems in a constantly shifting and dynamic business environment [2]. One requirement of ACP is a system load, which consists of an "amount of work assignments of a system" [1]. Most of the simulation tools employ this understanding of system load, but it is not sufficient for an ACP. Bernhard et al. define the system load as the flow of objects entering a system or as the number of objects entering a socio-technical system in a given time period [3, 4]. In case of the material flow simulation, the moment when an object enters the system is of special interest. The number of objects entering the system at a certain point in time and the time slot in between is of further importance. Due to these facts, simulation tools have to change their database and function to fulfill the enormous requirements regarding dynamics and flexibility. The utilization-based simulation shows the first step to harmonize the requirements of logistics. This paper presents a theoretical case study of the ACP of an intralogistics-system.

The paper will contain following main aspects:

- introduction and basics
- a model for utilization-based simulation
- theoretical case study
- integration in the IT scenery
- conclusion

Keywords: material flow simulation, intralogistics-systems, Anticipatory Change Planning

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¹ Intralogistics-systems: in-house logistics / materials handling / material flow systems

SALES AND INVENTORY MANAGEMENT SYSTEM FOR FARMER'S STORE AND PRICE ELASTICITY OF DEMAND BASED ON STAYING TIME

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ABSTRACT

Purpose:

As fresh agricultural products, i.e. fruits and vegetables, originate in nature, each of them has unique characteristics, e.g. size, weight, colour, taste, state of surface, production area, etc. There are no two products which have the same characteristics. Generally, price elasticity of demand is used for measuring responsiveness of demand to price. Because of the characteristics, it is difficult to calculate the elasticity. We propose a new definition of Price Elasticity of Demand based on staying time. The definition will be support on decisions about supply and demand especially for agricultural product trading. From one year operation records, we show two examples of the price elasticity. We present consumer's purchasing behaviour at the store and price zone which consumers attracted from analysis based on the price elasticity.

Research approach:

We have focused on Farmer's Store, where farmers sell their product to consumers directly. We have extended and updated an information system supporting the store business and run the information system for one year. We have collected data about staying time of agricultural product calculated from arrival time and sold time. The data are analyzed to availability of the new elasticity.

Findings and Originality:

Our proposed information system can be a method to monitor the elasticity based on the staying time, at least in the farmer's store. Relations between mean staying time and price are shown for packed prune and tomato respectively. On the case of prune, we have observed tendency of elasticity based on staying time however we have not for tomato. Some ingenious attempt is necessary to figure out the elasticity in business flow of the store and rules.

Research impact:

With our extension, field of applicable subjects of the elasticity is enlarged, where conventional elasticity can be applied to countable items. This expansion will support management decisions on prices according to balance of supply and demand.

Practical impact:

The price elasticity of demand based on staying time becomes useful to determine suitable price of fresh agricultural product at farmer's store, where freshness is an important advantage in competition with another distribution channels. Farmer can determine price according to expected staying time. If he want to sell in short term, he should set the price lower. To keep staying time at certain level, farmers also obtain advantages in store level completion with another farmer's store.

Keywords:

Inventory Control, Decision Support System, Consumer Behaviour

ORDERING STRATEGIES FOR SHORT PRODUCT LIFECYCLE PRODUCTS

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ABSTRACT

For short lifecycle Made-To-Stock (MTS) products, owing to (i) short lifespan (quick obsolescence), (ii) difficulties in repeated negotiations and procurement, (iii) long procurement lead-time and (iv) lower unit cost of acquisition in committing to a larger trade volume, retailers prefer to commit to their supplier the entire product demand that they expect during the product lifecycle at the time of launching itself.

However, it is also observed in many such products that the accuracy of lifecycle demand forecast improves with sales. This becomes a strong reason for retailers to not commit the entire expected demand at the launch itself. Patil, Avittathur and Shah (2008, 2010) have modelled this ordering strategies problem for an environment where product lifecycle demand is deterministic once the initial demand is known (in the early stage of the product lifecycle). They consider price markdown as a strategy only in the final stage of the product lifecycle.

In this paper we attempt to model the ordering strategies problem for a more complex supply chain situation - where (i) product demand would continue to be uncertain throughout the product lifecycle, but with decreasing uncertainty as time passes and (ii) price markdown could be a revenue enhancing strategy from the intermediate stages of the product lifecycle itself - with the objective of maximizing the retailer's expected product life cycle profit keeping the material order before launch of product, subsequent lifecycle replenishment orders, order splitting while dispatching material (transport batch sizes) and price markdown as decision variables. Our experiments suggest the importance of markdowns, splitting of the initial order, and not committing the entire product demand in one go as significant contributors to the maximisation of retailer profit.

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SECTION 6 – Decision Support Systems and ICT in Supply Chains

ANTECEDENTS OF SUPPLIERS' WILLINGNESS TO INVEST IN RFID

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ABSTRACT

Purpose:

This study aims to extend the adopting rate model of DOI to examine the channel behaviour of non-dominating suppliers and compare the channel effect with conventional innovation factors in adopting RFID.

Research approach:

Data from 130 Taiwanese suppliers for local retail chains were collected. Partial least square (PLS) was established to calibrate the effects of the constructs identified using VisualPLS version1.04b1.

Findings and Originality:

Results conclude that institutional influences have no effect on suppliers' RFID adoption intention. Alternatively, they indirectly affect the suppliers' intentions in investing in relationship with retailers. Further, the relational investment may significantly affect the suppliers' organizational readiness that places some effects on adoption intention. In general, the channel effects are greater than those of innovation characteristics for suppliers' adoption intention.

Practical impact:

The results place a great emphasis on channel management in future technology promotion, development, and adoption.

Keywords: Institution theory, RFID adoption, Channel behaviour

INTEGRAL DATA PROVIDING SOLUTION FOR CONTAINER SUPPLY CHAIN EFFICIENCY AND VISIBILITY

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ABSTRACT

Purpose:

The transport system integration process is characterized by increasing of transport system complexity, which includes simultaneously several challenges. These challenges are an increasing dynamics of involved logistics systems, bottlenecks in transport modes connections as well as new security restrictions/regulations for cargo shipments and customs processing in the ports. This paper presents an approach how to enhance supply chain visibility and at the same time support logistics operators in Business-to-Customs cooperation processes with the purpose to a better reliability and predictability of transport processes.

Research approach:

The project **INTEGRITY** or "Intermodal Global Door-to Door Container Supply Chain Visibility" has one of the goals to investigate how to integrate innovative technologies (Container Security Devices (CSDs), RFID, e-seals) with the new EU customs authorities' regulations (e-customs procedures). The **Shared Intermodal Container Information System (SICIS)** has been created in this project to allow fast and reliable access to the data along a supply chain for port community systems, shipping lines, port authorities, and logistics operators. The challenge for **INTEGRITY** is to integrate different components of complex transport system as a whole one. Therefore, the paper describes the data integrated approach with a strong focus on concurrently enhancing the supply chain security and improvement of logistic processes along the trade line China-Europe.

Findings and Originality:

This paper provides an overview how to integrate IT technologies with modern business processes, taking into consideration existing international transport regulations and legal and administrative changes that are still in the developing process (e.g. e-customs procedures in EU Customs Code, Authorised Economic Operator (AEO) approach etc.). Furthermore, the paper describes the unique neutral data integrating platform **SICIS** and its contributions in improvement of a global supply chain security, visibility and efficiency. This paper concentrates on **INTEGRITY** project contribution to make container supply chains more secure, predictable and reliable through the providing of business partners and customs authorities with the transport data in accurate, reliable, timely and value adding form. The study discusses as well already existing and currently developing solutions for secure and efficient intermodal transport systems. The concept of **INTEGRITY** presented in this paper introduces the new configuration of next generation of supply chains under the grief "trust but verify".

Practical impact:

The paper provides trade stakeholders and customs authorities with information about security IT platform **SICIS** that can be used for securing intermodal container chains on door-to-door basis by evaluating information from different information sources (CSDs, RFID, vessel and vehicle monitoring systems, etc.). **SICIS** enables to create the full-scale integrated IT system for logistics operators.

Keywords:

Supply chain visibility, security IT platform, container logistics, container security devices

CARGO INTELLIGENCE FOR INTERMODAL OPERATIONS

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ABSTRACT

Purpose

The ongoing research project EURIDICE focuses on the development of intelligent solutions for the transport sector. The basic concept of EURIDICE is an information services platform centred on the individual cargo item and on its interaction with the surrounding environment and the user [1]. This paper continues the research presented in the ISL2009 [2][3] with the analysis of the Intelligent Cargo (IC) concept and how the concept could be implemented in intermodal transport chains.

Design/Methodology/Approach

The research is based on the constructive research methodology, according to which the new construct for IC in intermodal operations will be developed, implemented and tested within a single case study. The paper discusses how intelligence could support the businesses of transport sector companies and other transport related stakeholders.

Findings

EURIDICE approach consists of making cargo information services available to the broad spectrum of potential users, by lowering adoption barriers related to cost, effort and information system requirements. The EURIDICE platform is open and scalable, where users will have the option to use and extend the EURIDICE services gradually, from data acquisition to automated transactions, intelligent data analysis and decisions support [1]. The platform will be tested in different case scenarios, one of which, the focus of this paper, involves an intermodal freight operator managing a railway wagon fleet. The EURIDICE platform provides automated wagon selection and management, but also automated alerting and event information originating from IC. The paper discusses the innovative features of IC in intermodal wagon management.

Practical Implications

The basis of the research is the EURIDICE vision, formulated as "In five years time, most of the goods flowing through European freight corridors will be 'intelligent', i.e.: self aware, context-aware and connected through a global telecommunication network to support a wide range of information services for logistic operators, industrial users and public authorities" [1]. The EURIDICE project will develop and implement a platform for providing services targeted towards the future transport vision.

Originality/Value of the Paper

The EURIDICE approach is to create an open, scalable mass solution for individual cargo objects in order to exchange data for decision-making purposes. The paper analyses the advantages of that approach.

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Keywords: Intermodality, Intelligent Cargo, Decision Support System

TRANSLATING SUSTAINABILITY FROM STRATEGY TO OPERATIONS: HOW CAN DECISION SUPPORT MODELS HELP LOGISTICS SERVICE PROVIDERS TO ATTAIN STRATEGIC AS WELL AS OPERATIONAL GOALS?

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ABSTRACT

Purpose of this paper

Decision Support Models could help Logistic Service Providers as a means to make transportation more sustainable. When researching this hypothesis, we discovered that Logistic Service Providers were reluctant to use Decision Support Models (DSM) when making transportation more sustainable. The purpose of our research to develop a framework of DSMs on sustainable transportation that will be practical to be used by the Logistic Service providers.

Design/methodology/approach

After discovering the need for a better understanding of the problem, a study of the available literature on the subject of DSMs, sustainability and transportation was made. On basis of this and in dept interviews with decision makers in transportation, a survey was set up and send to a representative cluster of Logistic Service Providers.

Findings

DSMs for sustainable transportation tend to be built as a set of tools and models on different levels (operational, tactical and operational) that are linked with each other in a complicated and difficult to maintain network.

Research limitations/implications (if applicable)

The finalisation of this research is not yet reach at this moment, but the preliminary results show a good indication to the expect final results.

Practical implications (if applicable)

The outcome of the outstanding survey will be used for further research and should result in an advice to builders and users of these DSM in order to save time and money and to improve the sustainability of transportation.

What is original/value of paper

Little is known of the use of DSM's on sustainable transportation by small and medium sized Logistic Service Providers. Most research concentrates on either strategy or operational use of these DSMs, but fail to clarify why models who should in principle be interesting for this target group are unused. We have build a new framework to investigate the use of DSMs on all three levels (strategic, tactical and operational) concerning decisions on sustainable transportation.

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UTILISATION-BASED MAINTENANCE OF INTRALOGISTICS-SYSTEMS

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ABSTRACT

Within recent years logistics have become more important. Complex production processes in all industries with just-in-time- and just-in-sequence-deliveries need one hundred percent efficient supply-chains [1]. The rule of a chain being as strong as its weakest link can be transferred to supply-chains. Consequently the requirements concerning reliability and availability of each link increase. This is necessary for production facilities and particularly for their intralogistics-systems, because logistics services cannot be produced to stock [2].

On this background, the importance of maintenance of intralogistics-systems increases. With adequate maintenance tasks it is possible to realise a required performance and availability of a systems [3, 4]. Modern techniques of diagnosis and prediction identify failures and variations of demanded functionality at an early stage and help adjusting maintenance to these changes.

The development of intelligent tools for monitoring components or complete intralogistics-systems, the possibility to predict the remaining life time under dynamic terms of use and the realisation of a usage-dependent maintenance come more to interest to machine operators and builders. Depending on seasonal variations of load, "breakdown maintenance" or "time based maintenance" are dissipations of resources. The sub-project C3 of the research project "Special Research Field 696 – Requirement-based construction of intralogistics-systems"² at the Technical University of Dortmund develops a solution for "utilisation-dependent maintenance" of intralogistics-systems to increase their reliability.

In this context data and information about the technical condition and especially about the stock of wearout of critical components are important. Furthermore the relationship between utilisation and wearout and their parameter are needed. At the beginning of the research activities, a data-base acquisition has been carried out at machine operators and builders.

The analysis of this survey result shows that in spite of the immense importance of reliability of intralogistics-systems, maintenance attracts less interest. While production facilities have a high priority in maintenance and modern concepts and tools, like e.g. Condition-Monitoring, are used, the maintenance of intralogistics-systems is operated breakdown- or time based.

Another result of the analysis is a lack of data and information mentioned above at machine operators and builders. Experience in maintenance is insufficient and therefore knowledge is not available as needed. This results mainly from two facts:

No detailed maintenance documentation exists, which could provide conclusions of failures and the real loads of components.

The high requirements concerning the availability of the systems are guaranteed by oversized components and implemented redundancies instead of adapted maintenance strategies.

Therefore the TU Dortmund established in cooperation with the Fraunhofer Institute for Material Flow and Logistics the "Logistics Condition Monitoring Technologies Laboratory" (Log CoMo-Tec Lab) to research the coherency between usage and wearout of components of intralogistics systems. This laboratory composed of different intralogistics components (e.g. roller conveyor) and different Condition Monitoring techniques (e.g. vibration analysis) and it is a case sui generis.

² Sonderforschungsbereich (SFB) 696 - Forderungsgerechte Auslegung von intralogistischen Systemen

The paper deals with the results and analysis of the survey related to constructing and operating of intralogistics-systems. Further the Log CoMo-Tec Lab is introduced and the actual and future research activities in the Laboratory are presented.

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IDENTIFYING TRENDS IN THE ADOPTION OF ICT IN PORTS TO ENABLE INFORMATION VISIBILITY IN LOGISTICS INVOLVING ROAD HAULAGE

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Purpose of this paper

Information and Communication Technology (ICT) is central to economic activities and logistics is no exception to that. Complex logistics arrangements can result from the combination of different modes of transportation like road, sea and air. In particular port operations comprise complex arrangements in where road transportation plays a key role. In this scenario ports can benefit from ICT developments because many of them suffer from congestion and are in urgent need of procedures and technologies to increase the throughput speed of goods (Nyquist 2009).

In Europe the EU Commission has launched initiatives to develop a pan-European maritime information infrastructure in order to reduce reporting activities between a vessel and different authorities and commercial entities (Ekelof, 2009). On the other hand, port logistics rely heavily on road haulage and as a result significant numbers of wireless ICT applications like cellular networks, Wi-Fi, UMTS, 4G and WiMax have been adopted in different facilities to enable communication between vehicles and port management. Unfortunately still there are significant reliability and connectivity problems due to difficulties associated with limited range, scalability and security (Coronado Mondragon et al. 2009).

This research aims at identifying trends in the adoption of sophisticated ICT solutions that link road haulage with the logistics operations taking place in different leading port facilities around the world. The findings are used to develop a model related to the adoption and standardisation of ICT platforms to enable total visibility in road haulage serving port facilities.

Design/methodology/approach

It was considered important to survey the latest ICT developments that have taken place in some of the most important port facilities around the world. Hence, case studies in the form of site visits to port facilities in the Humber Estuary UK, Zeebrugge Belgium, Busan South Korea, Hong Kong and Shanghai China were used in this research.

Findings

The study shows that terminal operators rely heavily in the use of corporate information systems for all task involving job/scheduling and transportation planning. On the other hand, the study shows that differences observed in the sites visited for this research can be associated to the way organisations have approached vehicle communications within the port facilities and the resulting track and trace capabilities which can impact visibility in the supply chain. The ICT survey of the sites visited shows a widespread use of different technologies including Wi-Fi and RFID-based devices mainly used in internal yard tractors.

The analysis of the use of ICT shows that the lack of a common ICT platform leads to the proliferation of technologies that may not be adopted by different players (terminal operators or road haulage companies). Harmonisation in the use of ICT to enable track and trace and its impact on visibility has to come from government initiatives that make compulsory the adoption of a certain standard or particular technology. On the other hand, terminal operators which may happen to be leading organisations in the industry have sufficient leverage power to force other players to adopt technologies developed in-house by them. Governments or logistics bodies/associations will have to step up to reach agreements that can lead to the standardisation of future technologies (e.g. use of a common technological platform) in order to reduce and mitigate the problems associated with technology proliferation.

Research limitations/implications (if applicable)

A limitation of this research is that the study did not include all of the five top container ports in the world. It is based on the Humber Estuary UK, Zeebrugge Belgium, Busan South Korea, Hong Kong and Shanghai China

Practical implications (if applicable)

Researchers, managers and practitioners could use the results to envisage the future development of common ICT platforms/solutions that addresses the logistics needs of port terminals and the interaction with road haulage within the yard terminal and outside of it.

What is original/value of paper

The paper provides a close look into some of the strategies regarding the adoption and use of sophisticated ICT solutions that have been adopted by some of the top leading port facilities in the world. From there a model is developed to understand how to develop common standard ICT platforms that can be used in port logistics.

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APPLICATION OF RFID IN COLD CHAIN FOR FOOD SAFETY AND QUALITY

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ABSTRACT

Purpose

This paper aims to provide the understanding of food supply chain and its critical issues such as safety and quality. The special focus lies in cold chain, a temperature-controlled supply chain for environmentally sensitive perishable food products. It also tries to identify the key elements that determine to achieve sustainable cold chain and provide initial impression of the current stage of research on food cold chain through literature review. Radio Frequency Identification (RFID) is suggested as a promising candidate to maintain and control the cold chain. RFID make it build an automated solution to conventional quality management system: Hazard Analysis and Critical Control Point (HACCP). Potential challenges, limitations, benefits and future trends of RFID applications in cold chain are discussed with examples applied.

Design/ Approach / Methodology

This paper follows thematic approach to literature review on the application of RFID technology in cold chain focusing food safety and quality issues. After examining the key elements of cold chain management, technological feasibility of RFID to cold chain is considered. Moreover, the critical role of cold chain is evaluated in social, economic and environmental context.

Findings

This paper identified that many factors including technology, good practices, supply chain coordination, legislative directives and trainings contribute to the success of a cold chain for safety and quality assurance. RFID is found as a promising technology that enables to improve the handling practices, to gain inventory control and to increase product visibility. The availability of embedded environmental sensing in RFID fulfils the requirement of cold chain to monitor and control environmental parameters. It also acts as a track and trace tool to identify the sources of food contamination, food-borne illness and the recipients of contaminated food in product recall and seizures. Traceability can be seen as a value-added marketing tool or competitiveness among the companies.

Research limitations/ implications

This paper focuses only on food cold chain although a cold chain covers for other types of temperature sensitive products such as pharmaceuticals and chemicals.

Originality/ Value -

The major contribution of this paper is an effort to clarify the key elements and critical success factors of a food cold chain by evaluating cold chain facilities and management issues. It is highlighted that adopting RFID in conventional quality management system (HACCP) make cold chain management system more automatic, responsive, preventive and effective. Mandatory operations such as traceability, monitoring control and responsive supply chain management are identified as complementary operations for food safety and quality assurance.

Keywords:

Cold Chain, Safety and Quality, Radio Frequency Identification, Traceability, Cold Chain Monitoring

Paper Type: Literature Review paper

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SUPPLY CHAIN in A BOX (SCiAB)

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INTRODUCTION

Supply chain management software solutions are tools and processes that are developed to deliver effective supply chain by managing logistics, supplier-customer relationships, and quality of products. In the ideal, this management software should provide an end to end view of the supply chain process and accurate information that helps in making business decisions. Typically, a well integrated supply chain management software should help firms synchronize supply with demand by managing distribution, transportation and logistics, supply network visibility, design optimization, collaboration, and analytics across the extended supply chain.

Over the years, supply chain management software solutions have evolved to provide information for the seamless integration of strategic options and tactical operational planning. For instance, supply chain management software in the retail sector today already provides solutions such as shelf availability, inventory visibility, responsive logistics, warehouse draw downs, integrated distribution channel planning, integrated transportation, and route planning that cater to the needs across different functionalities of the supply chain. Retailers are leveraging on such supply chain management software not just for managing supply chain activities but also gaining competitive advantage.

With the growth in contract manufacturing particularly in Asia and the increasing importance of service-based supply chains in Europe, there is a growing need to develop and integrate tools found in supply chain management software. While the leaders in such software are well acknowledged and operate in a distinct space such as those of SAP with its 11-percent market share, the other major software vendors, including Catalyst, G-Log, HighJump, and Logility, i2 Technologies, Descartes Systems, and Manugistics have to respond more proactively else they risk watching their SCM revenues drop. SCM vendors experiencing revenue growth are the ones that are looking closely at what customers need and are trying to service those needs. Today, customers need more than good piecemeal software. Instead, they want a complete suite of package which are basically retrofitted for today's business.

This paper seeks to present a supply chain in a box, which is just a collection of SCM tools built on a user friendly, system independent and language independent platform. Before we present the SCM tool, we highlight some of the relevant literature.

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SECTION 7 – Environmental Sustainability and Green Logistics

MILLENNIUM DOME TO O2: TRAVEL PLAN FOR A NEW ENTERTAINMENT FACILITY

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ABSTRACT

Purpose

The travel plan designed for the O2 is described in this case study as the teaching materials to help student understand how to make a travel plan for a newly developed leisure venue and the factors to be considered in making the plan. It illustrates how to design multimode transportation and mode split for passenger travel. It also allows students to consider environmental protection issues when developing a green travel plan for a new area.

Design/methodology/approach

This case is mainly secondary research and compiled from published resources about The O2, survey outcomes and monitoring reports provided by Anschutz Entertainment Group (AEG) (2006, 2007), as well as other relevant literature.

Findings

The travel plan is developed with comprehensive targets and a monitoring programme to encourage environmentally sustainable travel choices by visitors to the O2, and devised a coordinated approach for the benefit of the environment around the O2. Key strategies proposed in the travel plan include the appointment of a full time transport coordinator to work with partnership organisations, including the London Borough of Greenwich (LBG), Transport for London (TfL) and other transport operators, improvements to bus and underground services and a new river service from central London.

What is original/value of paper

The travel plan endeavours to encourage environmentally sustainable travel choices by visitors to the O2. The value of describing the travel plan in the case brings the readers a coordinated approach for the benefit of the environment around the O2. This seeks to encourage visitors to the O2 to use alternative modes to the private car or make more efficient use of existing modes and to introduce the health benefits of more sustainable travel.

AN EMPIRICAL STUDY ON THE DETERMINANTS OF ADOPTION OF GREEN PROCUREMENT IN MANUFACTURING SUPPLY CHAINS

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ABSTRACT

Purpose of this paper

The purpose of this study is to investigate the determinants of adoption of green procurement.

Design/methodology/approach

The relationship between the determinants and adoption of green procurement has been hypothesized. Based on the extant literature product performance, purchase price, the organization's environmental concerns, trading partners, and health and safety issues, are studied. Companies in the electronic industry that held ISO 14001 certification in Thailand before December 2004 were sampled for the empirical study. A survey was carried out with a sample of 150 companies in electronics industry. The empirical model then tested using regression analysis, to verify the hypothetical relationships of the study.

Findings

The results indicate that all of the hypothesized relationships were significantly supported in this study. Of the four variables, influence or pressure from the trading partners e.g., buyer's pressure on suppliers, was found to be the strongest predictor of the adoption of green procurement. This was followed by purchase price of products, product performance and the organization's commitment to environmental issues.

Research limitations/implications (if applicable)

The current was basically carried out within one particular country and within one industry. Hence, the findings are industry specific and indicative for other industries. But a wider study based on samples drawn from other industries and other manufacturing based economies may needs to be carried to understand the nature of the determinants of adoption of green procurement with the manufacturing supply chain.

Practical implications (if applicable)

This implies that, Original Equipment Manufacturing (OEM) and Original Designing and Manufacturing (ODM) companies in Thailand's electronic industry still have an opportunity to develop a competitive differentiation, if they adopted green procurement practices in response to the current wave of global environmental concern.

What is original/value of paper

This paper would enable understanding of the academic community as well as the practitioners who are trying to incorporate green supply chain or environmentally sustainable/responsible supply chains.

Key Words – Green supply chain, Environmental performance, and Green procurement

LIFE CYCLE ASSESSMENT OF THE ENVIRONMENTAL IMPACT OF LOGISTICS

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ABSTRACT

Purpose:

In this paper, we will consider the influence of logistics activities on a product's environmental impact over the course of its lifecycle, and particularly the greenhouse gas emissions generated during the logistics (distribution) stage, for each category of product. We will also seek to quantify the degree of impact that logistics activities have, as a percentage of the total LCA environmental impact, with the aim of demonstrating the importance of logistics issues in a product's overall lifecycle.

Research approach:

The Japan Environmental Management Association for Industry has introduced the "Eco-leaf Environmental Label" as a way to inform consumers about the environmental impact of products. We have analyzed the quantitative data obtained via the "Eco-leaf" system, which covers the environmental impact of products over their entire lifecycle, and examined the economic impact generated at the logistics level.

Findings:

If we look at overall averages for environmental impact at each stage of the lifecycle, it is apparent that logistics accounts for just 2.2% of the total lifecycle impact – a very low percentage, particularly in comparison to the raw materials production stage and the product use stage.

Examining the environmental impact at the logistics level more closely, when converted to CO₂ equivalents, we note that just less than half of all product categories (47.6%) generate 0.5kg of CO₂ or less during logistics. Construction materials and other products are heavily represented in this group. On the other hand, 19.0% of the product categories generate 10kg of CO₂ or more, and many types of machinery fall into this group. A majority of electronics products generate between 1kg of CO₂ or more, and these product categories contribute a large share of the logistics industry's overall environmental impact.

We noted that a product's weight has a very high correlation to the amount of CO₂ generated at the logistics stage. When we analyzed the CO₂ generated per unit of product weight, it became clear that electronics products tend to have a relatively high impact.

Originality:

In the process of making LCA, it has been difficult to obtain good quantitative data on the impact at the logistics stage. This issue has not been studied much, in the past. In this paper, we have provided quantitative information to clarify the environmental impact of logistics activities, and its relative importance compared with the impact at other stages of the product lifecycle. There are major disparities in the logistics impact of different products, both in terms of the absolute impact on the environment, and the share of total-life-cycle environmental impact. This paper seeks to identify those products for which logistics has a particularly large impact, relative to the total-life-cycle environmental impact for the product. These products should be a particular target in trying to address the environmental impact of logistics activities.

Keywords: Environmental Sustainability ,LCA ,Green Logistics

ECOLOGICAL IMPACTS OF AUTONOMOUSLY CO-OPERATING TECHNOLOGIES IN INTERNATIONAL SUPPLY NETWORKS – A MODEL FOR ANALYZING CO₂-EFFECTS BY IMPLEMENTING INTELLIGENT CONTAINERS IN FRUIT LOGISTICS

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ABSTRACT

The ecological footprint through the emission of CO₂ is a very important requirement for Logistics Service Providers. In the field of fruit logistics transportation as well as rejection effects are important driver for the emission of CO₂. Therefore, the implementation of the Intelligent Container (IC) that can measure the internal status of the transported fruits and communicate with other ICs and warehouses might lead to Complex Adaptive Logistics Systems (CALs) with possible positive effects on the transportation efficiency and rejection rates. A model that reflects verifiable causal assumptions between the visionary implementation of the intelligent container leading to the characteristics and outcomes of CALs and the emission of CO₂ does not exist. Thus, a hypothesis-based structural equation model for the assumed causal relations will be introduced.

Purpose:

Using the example of implementing the IC in fruit logistics networks, the paper's intends to develop a structural equation model that reflects hypotheses about the existence of causal relationships between the visionary implementation of the IC in fruit logistics and its effects on the emission of CO₂. Therefore, the paper aims to provide a characterisation of ISN in fruit logistics as CALs in order to establish a theoretical framework for the model development and intends to develop hypotheses about the existence of causal interrelations between a CALs, based on the smart features of an IC and the network's CO₂-emissions. These causal assumptions shall be integrated in a conceptual structural equation model that shall serve as a basis for further research and which will be discussed critically regarding its contributions and limitations.

Research approach:

After the introduction, the second section will provide a description of the characteristics of the given case in fruit logistics. Additionally, the autonomously controlling and co-operating features of an IC will be presented. This also comprises a classification of IC using logistics systems as CALs. The third section is dedicated to identify variables and causal interrelations between the smart characteristics of an IC and CO₂-emissions as a theoretically profound basis for a further measurement. In the fourth section possible contributions and limitations of the developed model to verify assumed environmental impacts of the ICs-network will be discussed and the paper will conclude with the results and implications for future research.

Findings and Originality:

Contributions towards the introduced approach are the verifiable compilation of causal assumptions in order to realise positive ecological impacts. Since the exact relations of implementing the IC into a large fruit logistics network are currently Systems, Autonomous Cooperation & Decentralized Decision Making, Structural Equation Modelling unknown, the characteristics of the ICs-network have to be thoughtful constructed, since different target functions are possible, e.g. the efficiency or the robustness that all indirectly influence the ecological impacts. Hereby, the introduced structural equation model allegorises a promising approach for investigating possible effects on the CO₂-emission.

Keywords: Cool Chain Logistics, CO₂-footprint, Complex Adaptive Logistics

ENVIRONMENTAL KNOWLEDGE MANAGEMENT FOR SUSTAINABLE 'GREEN' MANUFACTURING OPERATIONS: A CASE STUDY OF A STEEL MANUFACTURING FIRM IN MALAYSIA

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ABSTRACT

Purpose of this paper

With increasing awareness of sustainable practices and environmental protection worldwide, the 'green' wave of conserving the Earth's finite resources and protecting the environment have received overwhelming attention (Chien & Shih, 2007). Environmental management and green supply chain management (GSCM) have been embraced by many organizations across the globe with the aim of reducing pollution and enhancing its environmental performance (Boiral, 2002; Chien & Shih, 2007; Hsu & Hu, 2008). Even though the aim of organizations implementing GSCM is to enhance environmental and financial performance, the scope of GSCM practices is very wide and includes internal environmental management, external GSCM, investment recovery and eco-design or design for environmental practices (Zhu & Sarkis, 2004). In line with the increased need to managed these new practices, processes and mindset, knowledge management has therefore secured a relevant role in the interpretation of the competitive potential of an organization among managerial disciplines with the capability to generate, process and exchange environmental knowledge (Volpato & Stocchetti, 2007). The objective of this study is to identify the extent and scope environmental knowledge management practiced in the organisation and to evaluate its performance from the point of view of the sustainable and green manufacturing operations.

Design/methodology/approach

This study is based on a case study of a steel manufacturing firm in Malaysia. Interviews, observations and document reviews were conducted in this steel manufacturing firm located in the Southern region of Peninsular Malaysia. This study examines how environmental knowledge sharing behaviours persist within the firm and its effect on the efficiency of its environmental management practices based on the socialization, externalization, combination and internalization (SECI) model by Nonaka and Takeuchi (1995).

Findings

The socialisation and internalisation aspects of environmental knowledge management are the two key knowledge creation modes which it applied in order to 'green' its operations. Because of the high level of environmental knowledge sharing within the firm, employees possess greater knowledge and understanding on the environmental issues affecting it and are able to deploy this knowledge in the creation of new 'green' processes and activities that benefit the organisation in the long run.

What is original/value of paper

The main contribution of this study is the identification of the role of environmental knowledge management based on the SECI model in a steel manufacturing firm to show that knowledge management has a significant impact on the firm's performance – both in terms of conventional business metrics and 'green' or sustainability performance. It addresses a current gap in the literature on environmental knowledge management in a green supply chain context especially from a Malaysian perspective.

Topics: Environmental Sustainability and Green Logistics; Supply chain management

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STUDY OF ENVIRONMENTAL ACTIVITIES BY NEWSPAPER INFORMATION ARTICLES

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ABSTRACT

Purpose:

We try to determine the main factor for decision-making to implement environmental protection action. One factor for decision-making in the implementation of environmental protection actions is obviously economic condition factor. The final goal of this series study is to show how to develop accelerated methods for emergence environmental protection actions. We wish to execute decision-making for environmental protection action by many corporations or society.

Research approach:

We first selected keywords using NIKKEI TELECOM-21 and EL-NET. We analyzed the rates of occurrence using a statistical method. Next we studied the case of ozone layer destruction and related countermeasures as an example in which it is widely thought that countermeasures have been effective. In this study, we analyzed newspaper articles by what we will refer to as the grouping method, which is also known as the affinity diagram method, and generated the flow of government policy, environmental problem, and environmental countermeasures by companies.

Finally, we studied public opinion as investigated by the Japanese government.

Findings and Originality:

We concluded that the following hypothesis seems to be supported by the study. Hypothesis 1: The period of awareness of some specific environmental problems was shorter than that of other environmental problems. We believe that this phenomenon occurs without regard to actual environmental problems. The tendency for environmental problems to have the periods of awareness was demonstrated by autocorrelation of each environmental problem. The flow example of environmental problems and environmental protection action was shown for the case of ozone layer destruction. In this study we consider that good theory of environmental problems and public opinion may affect the acceleration of environmental protection actions. The effect of good theory and public opinion will implement on global warming, dioxin pollution and waste recycling will be studied in the future and, after that study, we will show the factors of resonance in emergence action for environmental protection actions.

Research impact:

Newspaper articles analyzed by the affinity diagram method and statistical method seem to be able to show important factors for decision-making in the implementation of environmental protection actions.

Practical impact:

The effect of good theory and public opinion will implement on global warming, dioxin pollution and waste recycling will be studied in the future and, after that study, we will show the factors of resonance in emergence action for environmental protection actions.

Keywords:

Environmental, Statistical method, Affinity diagram method,

Suggested topic area:

Case study

SECTION 8 – Management of the Customer-Supplier Relationship

“PRODUCT VALUE” AS BOUNDARY OBJECT IN MARITIME SUPPLY (case study)

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ABSTRACT

Purpose of this paper

In line with general recommendations by Ketchen and Hult (2007) in a special issue of *Journal of Operations Management*, this paper applies concepts from sociology and organisational science in logistics/SCM with empirical findings from the shipbuilding industry. Agility (features of supply network configuration) and responsiveness (a specific measurable aspect of supply network agility) are of key importance in rapidly globalising supply networks (Christopher and Peck 2004). “Product value” is achieved in distribution through transformation (logistics and production) to provide utility to users (customers) (Alderson 1965, Thompson 1967, Stabell and Fjeldstad 1998, Huemer 2006). A process view of product supply is applied in accordance with Koskela’s (2004) view of lean supply in the construction industry. A supply network is an arrangement of functional units according to their nature, number, and chief characteristics. A supply network configuration involves both technical and organisational features affecting system function. Within the IMP industrial network approach “business relationships” interlink firms supporting product supply (Jahre et al. 2006). Here a quest is to more precisely discuss how this resource facilitates economic and quality product supply through use of concepts of “boundary objects” and “boundary spanners” borrowed from the social sciences. According to Star and Griesemer (1989): “Boundary objects are objects which are both plastic enough to adapt to local needs and constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. They are weakly structured in common use, and become strongly structured in individual-site use. They may be abstract or concrete. They have different meanings in different social worlds but their structure is common enough to more than one world to make them recognizable means of translation. The creation and management of boundary objects is key in developing and maintaining coherence across intersecting social worlds”. Product value is an ideal type of boundary object. “Boundary spanners” create linkage through information exchange with “[boundary objects](#)” creating [shared meaning](#) across “boundaries”; dynamics linking people in organizations, across “boundaries” of departments and companies (Daft 1989).

The objective of this paper is to develop the outlined framework in conjunction with the case study findings.

Design/methodology/approach

Conceptual development grounded on a case study from the Norwegian maritime industry. Proposed model: Combining 1) the conceptual framework of “boundary objects”, 2) the IMP industrial network approach, 3) Alderson’s (1965) transvection, and 4) lean production/supply adapted to construction to interlink the following concepts: a. “product value”, b. “boundary objects”, c. “boundary spanners” in d. a supply-oriented business context. The model is proposed as basis for developing flexible supply network configurations.

Findings

A conceptual model places focus on how that developing “product value” involves coordinating actor perceptions through the use of technical “boundary spanners” at the intra-firm, business relationship and network levels. This represents an organisational approach to developing technical efficiencies.

What is original/value of paper

Provides conceptual development to logistics practice.

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AN ANALYSIS OF THE RELATIONSHIP BETWEEN INTEGRATION PRACTICES AND SUPPLY CHAIN ORIENTATION

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ABSTRACT

Purpose – The purpose of this paper is to present the relationship between integration practices (internal and external firm integration) and supply chain orientation (customer orientation, competitor orientation, supplier orientation, logistic orientation, operation orientation and value chain coordination).

Design/methodology/approach – Multivariate regression models are developed in order to identify the characteristics of determinants of relationship in the integration practices and supply chain orientation. The survey was administered to individuals identified from a list of owners, president/CEO, vice president, director, manager and senior staffs at 70 consumer goods companies in South Sumatera Indonesia. Among four hundred respondents, 248 were considered as valid from those who practice supply chain management for their business operations.

Findings – Internal firm integration is related to customer orientation, competitor orientation, supplier orientation and logistic orientation. Firm-supplier integration is related to logistic orientation, operation orientation and value chain coordination. Firm-customer integration is related to supplier orientation. Firm-customer integration is predictor of the customer orientation, competitor orientation, logistic orientation, operation orientation and value chain coordination.

Research limitations/implications – A vigorous multivariate statistical modelling process was employed to seek a possible relationship between internal and external firm integration and the supply chain orientation. Provides a practical and useful tool for supply chain managers to audit and assess supply chain orientation practices. For instance, the supply chain integration practices scales can be used to evaluate the extent to which business performance practices have been implemented, and their impact on the competitive capability of the company, provided supporting evidence to the conceptual and prescriptive literature regarding firm integration and supply chain orientation.

Practical implications – This paper explored the relationship between integration practices (internal and external integration) and six dimension of supply chain orientation so that management will be able to pursue better supply chain strategies applicable directly to their business environment.

Originality/value – This study presented overall and individual determinants of each integration practices (internal integration and external integration) affecting supply chain orientation.

Keywords: Internal and external integration, supply chain orientation.

ATTRACTIVENESS IN CUSTOMER-SUPPLIER RELATIONSHIPS – A CASE STUDY

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ABSTRACT

Purpose of this paper

A stream of literature has focused on the concept of attractiveness in buyer-supplier relationships. These studies suggest that supplier management is not merely about management and control but should also consider the human influence on the relationship (Ellegaard et al, 2003). The previous research has been mostly conceptual. This paper reports the results of two in-depth case studies.

The paper provides practical guidance to analyzing the role of attractiveness in a supplier relationship and explains how the various elements of attractiveness are viewed by different parties of the relationship in different contexts. Finally, the paper proposes an analysis tool for practitioners to support buyer-supplier relationship development from the attractiveness point of view.

Design/methodology/approach

The research was conducted as a multiple in-depth case study. The unit of analysis was a buyer – supplier dyad. In each of the two focal case companies three dyads were studied. Data collection was based on interviews conducted in all collaborating functions and on different organizational levels at the two customer (case) companies and the selected supplier companies. The main research instrument for data collection was based on the model proposed by Hald et al. (2008), comprising three elements of attraction in a business relationship: perceived expected value, perceived trust and perceived dependency. The focus of data collection was on these elements of attractiveness and on their role and importance in different supplier relationships.

Findings

Some preliminary findings:

- the method proved potential as one of the case companies wanted to adapt parts of the research questionnaire to its annual supplier survey. However, some challenges remain:
 - aggregation of differing perceptions by persons from different function
 - getting the perceptions of all the relevant persons included
 - getting from attractiveness evaluation and rating results to the development actions. Ratings themselves don't give answers what kind of actions to take.
- The relationship parties are mostly unanimous about the level of perceived trust. Discrepancies emerge when the two other attractiveness elements, expected value and dependence, are considered

Practical implications

Companies should try to identify such supplier relationships where attractiveness is particularly important. Understanding and taking into account the full range of elements that affect both customer and supplier attractiveness is also essential. Finally, developing relationship from the attractiveness point of view calls for practical evaluation and measurement methods and tools. For this purpose, a survey tool for relationship analysis is presented.

What is original/value of paper

The study illustrates how the various elements of attractiveness described in the research literature manifest themselves in real-life buyer-supplier relationships. The paper also increases our understanding of the role of attractiveness in different business environments and situations.

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BUYER-SUPPLIER RELATIONSHIPS IN THE MALAYSIAN RETAILING INDUSTRY

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ABSTRACT

Purpose:

The purpose of this study is to explore relationships among business interactions in marketing distribution channel that combined these principles namely, communication, trust, commitment, satisfaction and cooperation. This research will entirely connected between communication formality and relationships qualities of Malaysian retailers and its key suppliers. It addresses the effect of formal communication vs. informal communication towards trust, commitment and satisfaction as the relationship success factor which at the end resulted on cooperation as the ultimate outcomes. This study will demonstrate the important of relationships through analyzing antecedents, consequences, and inter-relationship of each constructs. To further focus on trust as the crucial relationships factor, variable of trust will be decomposed into five level as to investigate the cross sectional relationships.

Research approach:

This work considers retailers perspectives from quantitative survey method to generalize findings. Review from previous studies will lead to developing of questionnaires for new construct namely the five levels of trust (earned, verifiable, calculative, reciprocal and blind) as well as adaptation of instruments from previous marketing relationship field for available constructs. The framework will be tested by carefully choosing only product related retailers from a population of 2,794 total numbers of retailing companies listed by the Company Commission of Malaysia. Product related companies are choose as it involves large establish organization with several suppliers interactions. A set of questionnaire will be distributed through mail to the purchasing manager; evaluating the relationship with major supplier. Structural Equation Modelling (SEM) will be adopted as to examine the proposed framework and hypothesizes.

Findings and Originality:

This research is expected to give an insight of findings which related to non-western concept of relationship marketing. It will likely to enhance relationship behavioural theories of the important constructs in success functioning between business relationships. This research focuses on retailing industry in Malaysia unlike most common studies of buyer-seller relationships found in automobile industry. It deviates from most of other channel distribution research, giving an insight of Asian perspectives with focus on buyer perspective; point of view which often neglected among widespread results on manufacturing outlook. Moreover, it combine all the success functioning factors of a relationship into one framework as appose to separate these five constructive relationships of which has achieved the highest academic support. Additionally, the decomposition of trust into five levels was to generate new findings of how these individual types of trust affect overall trust.

Research impact:

This study will provide insight on antecedents and consequences of buyer-seller interactions specifically evolved around the relationship quality.

Practical impact:

The research is anticipated to discover specific behaviours that effect buyer-seller relationship, by which should retailers taken into account on any interactions. It will also inform practitioners of the process on how industrial buyer-seller relationship involved.

Keywords: Communication, trust, satisfaction, cooperation, commitment.

CUSTOMER RELATIONSHIP MANAGEMENT: THE EFFECT OF CUSTOMER, SUPPLIER AND EMPLOYEE RELATIONS ON ENGINEERING PROJECT PERFORMANCE IN A MALAYSIAN SEMICONDUCTOR MANUFACTURING FIRM

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ABSTRACT

Purpose of this paper

In many successful organizations, both its actions and functions are designed and performed with the aim of meeting the needs of customers in order to ensure long-term success as customer satisfaction relates to their retention and securing a more favourable market share (Fuentes-Fuentes, Montes, & Fernández, 2006). To attain competitive advantage in today's dynamic and turbulent business environment, it is important to emphasize quality when selecting and developing relationship with suppliers to collaborate on key supply chain activities and processes effectively (Kaynak & Hartley, 2008). The effectiveness of organizations also depends on its ability to satisfy their employees, a necessary goal for companies that wish to realize the benefits from its employee involvement activities (Kaynak, 2003). Therefore, the purpose of this paper is to analyse the aspects of customer, supplier and employee relations in a semiconductor manufacturing firm in Melaka using a quantitative approach based on the survey of the project leaders to determine how customer, supplier and employee relations contribute towards engineering performance.

Engineering project work requires the capability to efficiently manage projects in accordance with "hard" and predictable processes that prescribe work as it is needs to be done while at the same time being compatible with the "soft" and unpredictable processes that are often in contradiction with the former (Zika-Viktorsson & Ritzen, 2005, p. 198). Efforts to develop work methods, processes and routines have always been a part of work life and today, it is possible to discern an emphasis on co-worker participation in activities, aimed at the continuous improvement of work methods and work design, as a means towards development, learning and better goal fulfillment in organizations (Zika-Viktorsson & Ingelgard, 2006, p. 103). Taylor (1998) concurs that in close customer-supplier and employee relationships there is much greater opportunity to be conscious of what the customer really wants and is not pleased about.

However, Taylor (1998) explains that unless the customer-supplier-employee relationship parameters are measured, monitored and managed, the close contact with a customer can lead to a false sense of security and the loss of business, perhaps irretrievably. This shows that there is a need for quantitative studies in monitoring and measuring close customer/supplier relations in projects. As such this study aims to obtain empirical results on the effects of customer-supplier-employee relations towards engineering project performance by surveying engineering project leaders who are the nexus between the management team and workers that has not received adequate coverage in the engineering management and supply chain management literature.

Hence, the research question identified for this study is:

'What is the extent to which customer, supplier and employee relations in a semiconductor manufacturing firm affect the success of engineering project performance?

In this empirical study, the elements of customer-supplier focus and employee relations shall be analysed and correlated with the variables concerning engineering project performance which are time, cost, superiority, creativity and product development performance.

Design/methodology/approach

This study will employ the use of a self-administered survey distributed to project leaders of engineering projects that have been completed in the past 18 months. As such, the unit of

analysis employed would be the individual projects completed in a semiconductor manufacturing company in Melaka. At the close of the data collection period, a total of 251 surveys were collected. 25 surveys had to be discarded from further data analysis due to issues of non-completion and legibility. The data were entered in SPSS 17.0 and analysed using factor analysis, descriptive analysis and Pearson's correlation analysis.

Findings

Factor analyses reveal that the items are factored differently than the literature and the Pearson's correlation analyses indicate that strategic leadership and product/process management have a significant positive correlation with engineering project performance.

What is original/value of paper

The main contribution of this paper is the identification of new groupings of items that constitute strategic leadership and product/process improvement.

Paper Type: Research paper

Topics: Supplier Involvement in Product Development, Customer Relationship Management, Supply Chain Management, Supply Chain Performance Assessment

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A CONCEPTUAL FRAMEWORK FOR CUTTING DOWN BULLWHIP EFFECT WITH SHARING POINT OF SALE (POS) INFORMATION ACROSS THE SCM

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ABSTRACT

Purpose:

Nowadays "just in time function" has become one of the most important operations in the companies, and also in the value chain more attention has been paid to speed up distribution system and to minimize inventory levels. Accordingly, sharing real time and specific information play a critical role in the supply chain management process. The most important aspect of inefficiency in the supply chain is known as the bullwhip effect which usually occurs with variations of demand across the SCM. Literature shows that researchers look for causes and attempt to achieve proper approaches to countermeasures. This paper identifies sharing the point of sale (POS) data across the chain, as the most practical information which reduces order fluctuations across the supply chain.

Research approach:

The concept of beer game is used to prove this claim that sharing POS data has influence on order and demand variations across the chain. Based on Web service mode, Third party and Central information sharing two frameworks are proposed to share real time and accurate POS information among the supply chains.

Findings and Originality:

The study recommended that by sharing the important informative POS data, the demand variations will be decreased for achieving a proper method to crack bullwhip effect.

Research impact:

The consequences of this research would give invaluable information to all researchers who investigate for the methods of recovering bullwhip effect, companies' managers who desire to improve SCM implementation and to assist the development of an effective strategic plan to overcome the SCM problems.

Keywords:

Bullwhip effect, beer game, POS data, Framework

SECTION 9 – Design Configuration of Supply Chains

DESIGN OF AN RFID-ENABLED FRESH MEAT RETAIL SUPPLY CHAIN

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ABSTRACT

Purpose:

This paper reports on a research project to evaluate the benefits of using radio frequency identification (RFID) in a fresh meat retail supply chain.

Methodology/Design:

Value stream mapping (VSM), together with on-site interviews and discussions, was the primary research method for this project. The VSM examined all processes and stages of material and information flows along the retailer's meat supply chain.

Research Findings:

Non-value adding activities found included time and labour processes, which in turn led to increased errors. Our future state map suggested RFID technology use with plastic meat trays will increase information visibility, reduce handling and checking, and increase speed.

Research Limitations:

The retailer's fresh meat supply chain is complex and long; this project was a pilot and thus suffered from time and geographical distance limitations and does not reflect all supply chain actors.

Practical implications:

There are potentially large savings to be had by implementing RFID technology in certain aspects of the supply chain, particularly where information is required for traceability and control of food quality and safety.

Originality/value of the paper:

This paper has demonstrated the practical use of a proven technique, VSM, in a different context to highlight the advantages of designing and implementing RFID technology in the food supply chain. The benefits found in this project add to the RFID and supply chain literature and also provide additional evidence to allay RFID scepticism.

SUPPLY CHAIN FRAGILITY: A CASE STUDY OF ABNORMAL LOAD TRANSPORT FROM SOUTH AFRICA TO UNITED KINGDOM

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PURPOSE

As globalisation intensifies, configuring seamless flows of goods in a supply chain is critical in the current arduous trading environment. The specific purpose of this paper is to investigate the extent to which common commercial decision criteria such as cost and schedule reliability are replaced by other criteria especially in the case of goods which are extremely high in value and irreplaceable. Less tangible factors such as intuition and risk awareness become critical in handling the fragile cargo and, by implication, the potential fragility of the entire supply chain. In this case study, transport and intermodal transfer of a classic locomotive as an abnormal load from South Africa to Scotland, UK, is presented with detailed examination of the risks that are involved at each individual point of operation.

RESEARCH APPROACH

A multilateral case study approach in identifying critical operational factor in a range of commercial environments will be employed in reflecting on the transport of locomotive case study itself. Analysis of the critical factors will help to improve the understanding of various spectra of priorities in accordance to cargo type and transport environment. Industrial sources are used in order to highlight the disturbances in each individual point of transfer.

FINDINGS

No detailed research into fragility dimensions of locomotive transport has previously been carried out. Here, on the South Africa to United Kingdom corridor, individual interpretation and evaluation of fragility and risk is often found to be decisive. As for the case study, the fragility of the product itself constrains the transport options, and there are several scheduling points that are highly critical in intermodal transfer.

RESEARCH IMPLICATIONS

This paper extends the understanding of the relationship between cargo type and form, supply chain structure and risk evaluation.

PRACTICAL IMPLICATIONS

The research demonstrates that, in the case of high value, irreplaceable, easily damaged goods, and logistics cost is less important than risk avoidance. The research enables tentative conclusions to be reached concerning the ranking of critical supply chain success factor in the case of fragile cargoes.

ORIGINALITY

This study is the first attempt to detail the type and form of disturbances in the operation of a specific supply chain such as a long-haul shipment of a fragile consignment such as the classic locomotive.

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MANAGING RISKS IN NEXT GENERATION SUPPLY CHAINS: A SYSTEMS APPROACH

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ABSTRACT

Purpose:

Supply chains consist of numerous links interconnecting vast networks and these links are exposed to various operational risks as well as disruption risks (Craighead, et. al. 2007). Operational risks are referred to the inherent uncertainties such as uncertain customer demand, uncertain supply and uncertain cost. Disruption risks are referred to major disruptions caused by natural and man-made disasters such as earthquakes, floods, hurricanes, terrorist attacks, strikes, shortages etc. (Tang, 2006). Supply chain risk management follows three basic processes to manage supply chain risks: Identify, Assess and Mitigate. **This paper** considers a systems perspective towards managing these risks. It presents variables that may affect Next Generation Supply Chains and applies a System dynamics modelling approach (Oehmen, et. al. 2009) towards depicting the causal linkages of these variables with future supply disruptions. The systems approach focuses on utilising the aspects of feedback loops, in this case, the impact of the variables and the process after the risk/ disruption is identified towards the working of the system

Research approach:

The research approach for the paper is based upon application of systems engineering techniques to understand supply chains and its use for managing various risks associated with in the network. A Causal loop diagram is depicted which considers the variables affecting next-generation supply chains. The causal linkages between the variables are then highlighted with regards to the supply chain process and the nodes and the causes of future risks are identified. . Using the causal loop diagram, a risk framework is developed for next generation supply chains showing the impact of the risk.

Findings and Originality:

The paper presents the variables which will affect next- generation supply chains. It depicts the relationship between these variables and how these come together to create risks or disruptions in the supply chain. It shows that for. e. g. the effect that greening of the supply chain, which is ranked as the most influential variable for next-generation supply chains, will have on various nodes within the supply chain system and the causes for future risks. The paper thus presents a new perspective towards using systems thinking to manage future supply chain risks.

Research impact:

The research has focussed on literature and case examples derived from literature sources. The causal linkages between the next generation supply chain variables is highlighted with regards to the supply chain process and the nodes and causes of future risks. Using, the causal loop diagram a risk framework is developed for next generation supply chains showing the impact of the risk. This is checked with some instances of risk propagation within the aerospace sector. The next stage of the research will endeavour to create a simulation framework for simulating the risks associated with the risk factors.

Practical impact:

The outcomes of this study will help researchers and managers to identify next generation supply chain risks (which is based on variables, such as: green sc, lack of skills, role if technology, etc.). This research presents a new method for managers to consider their supply systems and map out the future risks. This will then help to implement a proactive approach towards managing risks within the Supply chain network.

Keywords:

Supply chain risk management, System Dynamic modelling, Simulation.

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COMPLEXITY IN VOLATILE VALUE NETWORKS

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Purpose:

In a world which has become ever more turbulent – due to environmental, political, technological, competitive events and disturbances – the ability to quickly and continuously identify potentials to improve the manageability of the value network is getting more and more important. This managerial challenge is solved unsatisfactorily in literature especially under dynamic and fast changing environmental conditions and common requirements of a company- and situation specific applicability. Companies operate in complex value networks and are forced to satisfy changing individual needs economically. The growing amount of service components and tailored products forces companies to act in and to successfully handle highly complex value networks characterized by numerous supplier relationships, multiple global production sites and distribution centres as well as numerous customer relationships in different regions around the globe. Uncertainty, customization, network dispersion,... all these factors lead to an increase of complexity in highly volatile and interdependent value networks. As complexity has significant influence on a company's performance (Vachon and Klassen, 2002) and this complexity is supposed to be increasing within the next ten years (Capgemini, 2008) the investigation of interdependencies between the complexity parameters and their effects on the performance of the entire value network is extremely valuable for practitioners as well as academics. (Meyer, 2007).

Therefore the purpose of this paper is to analyze previous research according to the following points:

- parameters in a value network that increase complexity and hinder the orchestration of the company's value network,
- and introduced methods (e.g. Sivadasan, 2006; Müssigmann, 2007) to continuously and quickly identify optimization potentials company-specific within a value network from a complexity perspective in a volatile environment.

The following research question is guiding this paper:

RQ: What parameters determine the complexity within a value network in general?

Design/Methodology/Approach:

This paper is based on an extensive and traceable literature review of more than 100 articles related to complexity in value networks in scientific periodicals in logistics/supply chain management between 2000 – 2009. The articles are analyzed according to an initially developed structured framework and the identified parameters of complexity are operationalised using quantitative and summable measurement categories.

Findings:

On the findings of the literature review the parameters of complexity in a value network are defined. Furthermore their buffering or vibrating effects from a network perspective are discussed.

Research limitations/implications

At the moment the literature review is limited to periodicals in logistics/supply chain management. An extended review including network theory and systems theory can be promising.

Besides this, requirements of supply chain managers are not considered at current state. Therefore 12 semi-structured interviews are planned to fill this gap.

Practical implications

The investigation of interdependencies between the complexity parameters and their effects on the performance of the entire value network is extremely valuable for practitioners as well as academics.

What is original/value of paper

The contribution to theory of this paper is the investigation of interdependencies between the identified complexity parameters and their effects on the entire value network. Furthermore the development of a general set of complexity parameters and the consideration of the vibrating or buffering effects within a value network are valuable findings of this paper.

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A FRAMEWORK FOR DEVELOPING FLEXIBILITY IN ENGINEER-TO-ORDER SUPPLY CHAINS

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ABSTRACT

Purpose:

The engineer-to-order (ETO) supply chain structure has the highest levels of customisation across all activities when compared with other types of supply chain, and each product is designed for the needs of a specific customer, resulting in high levels of uncertainty. Most of the published research in operations and supply chain management has neglected the needs of the ETO sector and, while numerous studies suggest that a philosophy of 'one size fits all' strategy to supply chain management is not appropriate, there are very few guidelines for the specific strategies that are suitable for the ETO supply chain. The aim of this paper is to develop and test a framework for organisations to develop the appropriate flexibilities for the uncertainties in ETO supply chains.

Research approach:

The research design is structured in two phases. First, a case study phase is presented. Three units of analysis are specified within an ETO system boundary: network co-ordinators, projects and supplier pipelines. In total, this paper investigates two network co-ordinators, five projects and twelve supplier pipelines across two ETO systems. The second phase is based on seven evaluation interviews using a selection of participants from a range of ETO industries. These interviews offer an indication of the extent to which these findings can be generalised to different ETO environments.

Findings:

A four-step route map for organisations in the ETO sector is presented. The four stages are: identify supply chain structure, identify supply chain uncertainties, optimise pipelines and configure the network with required flexibility levels. The case study phase of the research suggests that 23 of 42 system uncertainties can be mitigated using the framework. Based on the evaluation interviews, this paper concludes that while these findings are case specific the generic stages of the route map are applicable across ETO sectors.

Research impact:

There are very few guidelines for the specific strategies that are suitable for the ETO supply chain. This paper addresses a gap in the literature by presenting a framework for considering supply chain design in the ETO sector. The synthesis of concepts relating to supply chain structures, supply chain uncertainty, pipeline management and supply chain flexibility makes the important contribution of consolidating and establishing relationships between fields and concepts.

Practical impact:

The framework provides a practical, structured route map for organisations to move towards more flexible supply chains, which are tailored to their own specific needs and operating characteristics.

Keywords:

Uncertainty, Risk, Flexibility, Engineer-to-order

CONFIGURING NEXT GENERATION FOOD SUPPLY CHAINS: A RISK PERSPECTIVE

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ABSTRACT

Purpose:

Configuration is defined as "an arrangement of parts or elements that gives the whole its inherent form" [1]. Chandra et al. [2] describe the problem of supply chain configuration as one which relates to determining which units (e.g. suppliers, plants), their size, location etc to include in the supply chain. It also looks at establishing and maintaining the linkages between these units. Whilst configuring and even reconfiguring a supply chain has been a topic of significant interest amongst researchers the basis of the configuration is often limited. Beamon [3] reviews the available literature pertaining to the design and optimization of supply chains and identifies several performance measures for supply chain modelling. These can be broadly classified either on the basis of cost reduction (minimize cost, maximise profit), inventory reduction (lean, agile) or customer satisfaction (target service level).

An often overlooked aspect of today's business environment in general and supply chains in particular is uncertainty. The scenarios of loss of supplier, transport strikes, IT services failing, stock outs etc are becoming all too common. Looking at the future of supply chains, uncertainty and risk appear to be increasing and will play a crucial part in the configuration of next generation supply chain. This paper presents an alternative approach to supply chain configuration using supply chain risk as the minimising variable. Perishable nature of the product and high risk impact in the Food supply chain offers perfect conditions to situate the study. Also, current trends in food supply chains namely globalisation, consolidation and commoditization indicate greater need for inherent risk minimisation while configuring future supply chains [4]. Using data from secondary sources and semi-structured interviews with respondents in a food supply chain, this exploratory study identifies the factors which need to be considered while configuring such a supply chain. The relationship between these factors is developed into a research framework.

Research approach:

The research stems from three research questions:

1. What are the trends affecting next generation food supply chains?
2. What are the risks affecting next generation food supply chains?
3. Can next generation food supply chains be configured with an aim to minimise risks?

The research approach is qualitative and conducted in two stages. The first stage includes secondary data analysis and second stage consists of semi-structured interviews with supply chain professionals within a UK confectionary supply chain. Secondary data in the form of extensive literature review and industry reports from within the field of supply chain design/configuration as well as supply chain risk management is used for content analysis. The data from these secondary sources and interviews was analysed using 'document summary sheets' and 'contact summary sheets' as suggested by [5]. Relevant units of meaning were extracted from each source. These units were in the form of quotes, words, and critical incidents (as a complete unit). Based on the risks affecting next generation food supply chains, a framework is developed which provides an insight into configuring food supply chains with the intention of minimising risks and eventually minimising the impact of the risks.

Findings and Originality:

The paper has presented insights from a qualitative study conducted to study the trends and risks affecting next generation food supply chains, and suggest ways to configure the food supply chains to minimise risks. A conceptual model (STITCH) has been developed which considers the important factors relevant for minimising risks and suggestions are provided on how the factors work with each other for the configuration.

Research impact:

The research has focussed on literature and case examples derived from literature sources and insights from semi-structured interviews. The analysis has led to a new conceptual model for food supply chain configuration on the basis of risks. The next phase of the research will endeavour to operationalise the links and empirically test out the factors for their strength in alleviating food supply chain risks.

Practical impact:

The STITCH model developed through this study presents the factors that are important for configuring next-generation food supply chains. The model provides an insight for managers to consider when operating within the food industry. The model will also help individual supply chains to consider the relevance of the factors for their own scenarios and configure the supply chains based upon the weights applied to each factor.

Keywords:

Supply chain risk management, Supply chain configuration, Food supply chains

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STRATEGIC FLEXIBILITY CAPABILITIES IN THE CONTAINER LINER SHIPPING SECTOR

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ABSTRACT

Purpose:

This paper reflects on the notion of flexibility from the perspective of the major liner operators in the container shipping sector and asks how flexible strategies can be deployed to maintain the stability of the maritime component in the international supply chain. Flexibility strategies which may be adopted by liner operators to better adapt to the commercial scenario they face are identified (developed from Naim et al's (2006) typology of transport flexibility). From this foundation the principal flexibility types which may be used to restrict supply capacity by container shipping companies in their attempts to restore a better equilibrium to the market for international container shipping movement are explored.

Research approach:

The study will use secondary data taken from industry sources to reflect the empirical developments taking place in the sector to address this. Knowledge will also be supplemented by a case study based on a semi-structured interview with the UK Managing Director of a leading shipping logistics company.

Findings and Originality:

Naim et al's (2006) typology of definitions for transport flexibility (internal types), are refined in the context of container liner shipping. Contributions include a revised menu of flexibility method/tools for use by container liner shipping operators and three new flexibility types:

- **Horizontal Inter-organisational Flexibility** - the degree to which the use of infrastructure can be coordinated between users (previously this was part of Naim et al's (2006) Temporal flexibility type)
- **Mobility Flexibility** - the ability to re-deploy a transport asset - for container liner shipping this includes an ability to switch container ships to other shipping lanes
- **Ownership Flexibility** - the ability to utilise outsourced agents to minimise risk of under-utilisation of asset exposure - in shipping this involves the degree to which chartering arrangements can be set up.

On examining the flexibility types it is found that although certain flexibility tactics have been deployed, for example, Ownership Flexibility through chartering, Capacity Flexibility via moth-balling and other tactics and Temporal Flexibility by delaying new builds, these largely reactive strategies have not been enough to stabilise the supply side of the market.

Research impact:

The paper adds to the understanding of flexibility application in transport and logistics with particular reference to the container liner shipping industry.

Practical impact:

The liner companies lost around \$11 billion for 2009. A more refined understanding of how flexibility tactics can be deployed to contain future losses and inform future strategy development is highly relevant to the operators in this sector.

Keywords:

Flexibility; Transport Flexibility; Container Liner Shipping

SECTION 10 – Reverse Logistics

INVESTIGATION OF THE EXTENT OF REVERSE LOGISTICS MANAGEMENT IN MALAYSIAN AUTOMOTIVE INDUSTRIES

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ABSTRACT

Purpose:

The research looks at the level of implementation of reverse logistics management by Malaysian automotive industries.

Research approach:

The study developed a score sheet which was distributed to supply chain managers in the automobile industries and their suppliers, and also their customers. They were all asked to assess their companies based on some defined metrics. The result was used to derive conclusions and inferences.

Findings and Originality:

Based on the findings, it has been revealed that reverse logistics management practice in the Malaysian automotive industries have not received the necessary attentions. This study is the first of its kind in the Malaysian automobile industries.

Research impact:

The study has opened the door into performance measurement in reverse logistics management research in general in Malaysia.

Practical impact:

The study stirs up awareness on reverse logistics management in automobile industries in Malaysia. Managers have also been given an opportunity to understand areas which require critical attention in their reverse logistics management.

Keywords:

Reverse logistics, performance measures, automobile industry

EFFECTIVE E-WASTE MANAGEMENT: THE ROLE OF INTERNATIONAL COOPERATION AND FRAGMENTATION

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ABSTRACT

Purpose:

This paper characterizes the driving forces of international trade in wastes and investigates the conditions and outcomes of fragmentation in recycling industry.

Research approach:

We establish our propositions by analyzing the existing literature and countries statistics, making a foundation for analytic arguments in a stylized mathematical model.

Findings and Originality:

In the premise that environments and economic/social benefits can be exchanged among countries, we offer managerial conditions on international cooperation solution that increases e-waste treatment cooperation and fragmentation and contributes to effective e-waste management.

Research impact:

E-waste problems related to trade in wastes and informal recycling in the developing countries address environmental, social, and economic effects. Moreover, given on multiple aspect considerations, recycling fragmentation trade leads to effective e-waste management.

Practical impact:

It is getting prevalent that the wastes of materials and components generated in developed countries export to weaker economies for recovering recyclable resources. We offer a suggestion that only not can avoid the draw-back of environmental impact but also make cost effective maximally.

Keywords:

E-waste Management, Recycling Fragmentation Trade, International Cooperation, Importing Countries, Exporting Countries, Environment Impact

THE TASK ENVIRONMENT, RESOURCE COMMITMENT, AND REVERSE LOGISTICS PERFORMANCE: EVIDENCE FROM THE TAIWANESE HIGH-TECH SECTOR

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ABSTRACT

Purpose:

The purpose of the study was to construct a model in order to understand the empirical effects of the task environment on reverse logistics resource commitment and resulting performance.

Design/methodology/approach:

The Taiwanese computer, communication, and consumer electronics (3C) manufacturing and retail industries were investigated by questionnaire administration. Structural equation modelling was employed to model relationships among the latent constructs of the task environment, resource commitment, and environmental and economic performance.

Findings:

From 349 valid samples, it was found that the task environment has a positive and significant influence on resource commitment. In turn, resource commitment positively and significantly influences the economic and environmental performance of reverse logistics independently. Additionally, environmental performance significantly and positively influences economic performance.

Research limitations/future research:

This study focused specifically on manufacturers and retailers in the Taiwanese 3C industry, thus potentially limiting the generalizability of the conclusions. Further studies may wish to focus on other industries or countries, allowing for future comparability.

Practical implications:

The deployment of a firm's reverse logistics resources depends on external environmental change. Firms cannot seclude themselves from the external environment, especially the task environment. Under a climate of rapid changes in technology, industry, and markets, firms have to learn to identify opportunities, detect threats, and seize trends based on their task environment.

Originality/value:

In the past, economic and environmental performance have been considered to be inherently in conflict. In stark contrast, this study has shown that it pays to be green. Under a climate of increasingly strict international regulations, governmental legislation, and the increase in consumer environmentalism, firms are advised to reappraise their reverse logistics resource commitments appropriately.

Keywords: Task environment, resource commitment, reverse logistics performance, Taiwanese 3C manufacturers and retailers, environmental performance

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SUSTAINABLE DEVELOPMENT IN THE CHINESE ALUMINIUM INDUSTRY

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ABSTRACT

This research was carried out to investigate the historical development in the Chinese aluminium industry, with regard to sustainable development of the Closed-Loop Supply Chain (CLSC). In doing so, it identified the development pattern since the 1970s in order to configure next generation supply chains and future development direction. Data and information were collected by case studies and in-depth interviews with local officials, managers and operators in the aluminium industry in Dali town, Pearl River Delta (PRD) region in South China. Analysis and frameworks were developed from the collected information in order to demonstrate the industrial development to provide better understanding of the CLSC for sustainable development, especially with the aim to provide academic and practical understanding and guidelines for emerging industries in their future sustainable development. With the development of Virtuous Spiral Cycle that goes beyond a CLSC, this research provides better understanding of factors that influence the sustainable development of CLSC, and suggests further development of CLSC for higher level of economic, social, environmental and operations management.

Purpose of this paper

There is increasing attention in reverse logistics and supply chain management, especially in the Western developed countries. This research is to investigate and explore the operations in the context of developing countries using the Chinese aluminium industry as a case study example.

Design/methodology/approach

This paper is part of the PhD research findings from "Contextualisation of Closed-Loop Supply Chains for Sustainable Development in the Chinese Metal Industry" (Huang, 2009). Qualitative empirical research was carried out with semi-structured interviews and observations with local officials and case companies in the primary and secondary metal manufacturing and remanufacturing sectors in Dali town. More than 60 interviews and 168 research hours were performed for data collection. Extensive research analysis and evaluation were carried out based on the interviews and case observations.

Findings

With the development of sustainability from the survival level to maintaining quality of life and further improvement, there are higher levels of benefits in economic, social, environmental and operations dimensions. In the case of the Chinese aluminium industry, this research shows that the CLSC goes further as in the Virtuous Spiral Cycle pattern because of the development in the level of sustainability, technology development, human resource, knowledge and techniques.

Research limitations/ Practical implications (if applicable)

This research was performed in the Chinese aluminium industry, more research should be encouraged in various industrial context in order to identify the characteristics of CLSC and the applicability of the Virtuous Spiral Cycle. In addition, further research would identify factors that push up the CLSC for sustainable development, in order to guide industrial activities for better efficiency and continuous improvement for the future.

What is original/value of paper

This research investigated a comprehensive supply chain framework using the Chinese aluminium industry as an example, in order to provide valuable background information

for the sustainable development in developing countries contexts. These would enhance academic and industrial understanding of CLSC management.

Topic Area: Environmental Sustainability and Green Logistics

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SECTION 11 – Transport, Distribution and Third/Fourth Party Logistics

THE FUTURE OF SUPPLY CHAINS – THE IMPACT OF AN ENERGY CONSTRAINED, SUSTAINABLE AND LOW-CARBON WORLD

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ABSTRACT

Purpose:

The future of the logistics service industry is characterised by many challenges and opportunities. Intensifying globalisation and more discerning customer expectations are just two factors which lead to a more turbulent environment. As a consequence, logistics service providers have to systematically analyse future developments in order to be better prepared for the future and to plan in a more valid and future-robust way.

In order to develop a valid long-range scenario for the transportation and logistics (T&L) industry until the year 2030, a real-time Delphi survey was conducted among top executives worldwide. The leading question of the research project was to find out how future supply chains are likely to evolve in an energy-constrained, sustainable, and low-carbon world.

Research approach:

In order to develop valid, acceptable, plausible, and consistent scenarios, we conducted a real-time Delphi study in which 48 experts from more than 20 countries around the globe participated and provided their estimates about 18 future propositions in five different topics (e.g. energy and emissions, consumer behaviour, transport modes, and supply chain design).

Participating experts of the real-time Delphi study included C-level representatives from prestigious global companies, academics from the fields of logistics and supply chain management, and politicians.

These experts could provide their estimates on probability of occurrence (scale from 0-100%) and impact (Likert-Scale from 1 to 5) on 18 future propositions as well as qualitative arguments which supported or rejected the propositions.

Findings and Originality:

The experts' estimates and arguments were used to draw pictures about probable, high impacting, and desirable futures and to create plausible, consistent, and thought-provoking scenarios. Thus, it was possible to create scenarios which addressed the question of how the T&L industry will deal with problems of energy and emissions, how consumer behaviour may change in the future, how future transport modes might look like, how future supply chains may be designed, and how innovations will impact the industry until 2030.

An example for the scenarios includes that by 2030 costs of emissions will be paid by those who reap the benefits. This development will not only be spurred by regulation, but also by changes in consumer behaviour. Although our experts agree that the importance of regional supply chains will further grow in some sectors, the majority of supply chains will remain global in nature. However, transport costs and emissions become increasing key constraining factors of their growth. But the experts doubt that even elevated oil prices become the primary driver for fundamental change in the sector and believe that alternative energies will be able to compensate for the diminishing oil reserves.

Research impact:

Within the scope of the research project, an innovative real-time Delphi approach was conducted. By applying this internet-based research approach, it was possible to eliminate weaknesses of the conventional Delphi method, such as panel mortality and process time.

In addition to that, the development of future scenarios of the T&L industry in 2030 provides impetus for decision makers in practice and politics as well as outlooks for further research in academia.

Practical impact:

Our research findings deliver valid and reliable data for scenario planning and support decision makers in developing future-robust and sustainable strategies. The findings help to analyse complex situations in the logistics environment and to support long-term strategy processes.

Keywords:

supply chain, future, Delphi, scenarios, transportation, logistics industry

THE IMPACTS OF WEATHER UNCERTAINTIES ON FREIGHT TRANSPORT SUPPLY CHAINS

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ABSTRACT

Purpose of this paper

While much research has been undertaken on the impact of weather uncertainties on the demand side of business, little has been done on the supply side. Various weather events could cause 'delays' (Short 2002) and 'monetary losses' (Watanabe 2006). This paper firstly identifies the impact of weather uncertainties on the freight transport elements of the supply chain, and secondly it assesses the predictability of weather forecasting services to mitigate the impacts of such uncertainties.

The objectives of the research are;

1. Identify the risk (in terms of severity and frequency) that various weather events have on the different modes of freight transport.
2. Assess the predictability of a weather forecasting service with regard to freight transport.

Design/methodology/approach

An existing 'Logistics Triad Uncertainty Model' (Sanchez Rodrigues et al., 2007) is utilised for undertaking the analysis. Via a survey of UK logistics practitioners' estimates of weather-related risk are provided based on assessments of delays and monetary losses that weather events cause. Interviews with weather forecasters are undertaken to determine the granularity and accuracy of weather forecasts.

Findings

The predictability of weather forecasting service depends on the weather event being forecasted. Each weather event is distinctly associated to "possible forecast accuracy" and a "possible level of forecast customization". Particularly with regard to multi-modality, wind is seen to have the most impact on freight transport but it is also the most predictable. The paper concludes that there is major opportunity for utilising weather forecasts to ensure the resilience of multi-modal freight transport chains.

Research limitations/implications

The estimation of risk associated with each weather event, is based on the responses to the questionnaire-based survey, and could vary with number of survey-respondents. In addition, the accuracy related to a forecast depends on the 'forecast length' and the 'forecast grid side'. These dependencies are not elaborated in this paper.

There is limited literature related to impact of weather on freight transport (specifically). This could be a future research topic. The cost implications of adverse weather, that are specific to freight transport, could be an interesting research area.

Practical implications

Usage of weather forecasting in freight transport could reduce delays in the supply chain and hence add to total customer value. However, there are some limitations to the accuracy and level of customisation of forecasts related to some weather events like snow and fog.

What is original/value of paper

Some previous research has been undertaken on the impact of weather on impacting customer demand behaviour and on the supply of agriculture and food. There is also considerable interest on the impact of freight transport on climate change. This paper takes an alternate view and assesses how extreme weather events, governed by climate change, may impact on freight transport and how logistics companies may make best use of available forecast data to mitigate against such events.

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APPLYING LEAN PRINCIPLES TO ACHIEVE CONTINUOUS FLOW IN 3PLs OUTBOUND PROCESSES

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ABSTRACT

Purpose:

In practice it tends to be perceived as impossible to achieve continuous flows in a 3PL's outbound processes (Gu, Goetschalckx, & McGinnis, 2007; de Koster, Le-Duc, & Roodbergen, 2007). The purpose of the present study is to investigate whether lean practices can indeed help achieve such flow.

Design:

First, literature is reviewed to identify the conditions required for lean outbound flows in 3PLs. Then empirical data are collected within the outbound processes of a 3PL by means of time measurement. These results are analyzed with the help of a simple simulation model showing the consequences of various optimization objectives in terms of minimising waste and achieving an uninterrupted flow of goods.

Findings:

Results show that different objectives yield different solutions in terms of numbers of workers needed as well as levels of unintended work in progress between the various processes. Continuous flows can be achieved both by means of push and by pull planning, provided three requirements are met: demand management should focus on the company's ability to balance its demand- and capacity requirements, standardisation should focus on standardised operating procedures and cycle times, and multiskilled workers should bring in flexibility to cope with exogenous flow disruptions. However, push planning may cause stocks of products to be shipped.

Implications:

For the simulations standardized work processes were assumed and standard times were calculated. In practice these have to be determined, which is a complex process in 3PLs because of the heterogeneity of products, ordered quantities and numbers of orderlines in orders.

Originality:

Lean is pretty common in manufacturing but much less in logistics (Jones, Hines, & Rich, 1997; Reichhart & Holweg, 2007). Outsourcing, as in case of 3PLs, inhibits continuous lean flows in logistics even more, because customers may send orders last minute but nevertheless demand living up to KPIs, thus forcing the 3PL to improvise and remain flexible to meet the standards set for the KPIs. Our study demonstrates that despite these constraints lean practices can indeed contribute to achieve flows in 3PLs' outbound processes, thus contributing to a smooth supply chain.

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THE IMPACT OF LOGISTICS RESOURCES ON PERFORMANCE: A SURVEY OF MALAYSIAN LOGISTICS SERVICE PROVIDERS

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ABSTRACT

Purpose:

In the competitive world, it is essential for LSP to gain access to, and transform the right resources into superior logistics performance. However, there is still a lack of research which conceptualizes and measures the constructs of logistics resources and further testing their impacts on logistics performance. This study identifies, conceptualizes, and measures logistics resources which may have a positive impact on logistics performance. Grounded in resource-based-view (RBV) theory, the paper tests the relationships between logistics resources and LSP's performance.

Research approach:

A survey questionnaire was piloted by 10 logistics experts before it was sent to 354 Malaysian's LSPs. Of these there are 123 usable questionnaires with a response rate of 35 percent. Factor analysis was performed to determine the constructs and measures of logistics resources; and linear regression analyses were performed to test the relationships between logistics resources and logistics performance.

Findings and originality:

Results from the exploratory factor analysis concluded tangible resources which is divided into two separate independent variables: technology and physical resources; and intangible resources which is divided into three separate independent variables: relational, management and organizational resources. Logistics performance is measured in two separate dimensions: customer service innovation and cost leadership. Each of these constructs had Cronbach's alpha above 0.70, Eigen values above 1, variance explained above 16%. Regression analyses indicate positive and significant relationships between each of the five logistics resources and logistics performance.

Research impact:

This paper contributes to the development of the constructs of logistics resources based on RBV theory. The paper also provides empirical evidences of the associations between each logistics resources and logistics performance.

Practical impact:

In practice, it is difficult to determine which single strategic resource has actually contributed to LSP's performance as these resources may vary in their individual contribution. The five components of logistics resources should be seen as key resources to be actively managed and harnessed. Thus, LSPs should acquire, provide and develop high these five components of logistics resources.

Keywords:

Resource-based view, Logistics resources, Logistics service provider, Third-party logistics, Logistics performance.

INNOVATION CAPABILITIES OF LOGISTICS SERVICE PROVIDERS- AN INVESTIGATION OF DRIVERS FOR INNOVATION

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ABSTRACT

Innovations have become a very important factor for the success of companies. Product as well as process innovations can be sources for the differentiation from competitors by offering new or improved products and can lead to competitive advantages. Especially, the market for logistics shows some characteristics which make innovations very crucial (e.g. globalization and increasing customer demands). However, the innovation rates in logistics are very low in comparison to other industries. Therefore this **conceptual paper** aims for analysing how the innovation capability in logistics companies can be increased.

Research approach:

The paper uses a framework of general drivers for innovations in industries in order to investigate how these are applicable to Logistics Service Providers. Afterwards they will be investigated regarding their importance to cope with the new requirements resulting from logistics market characteristics, especially increasing customer demands. Therefore, a hypotheses discussing approach will be used in order to verify them hypotheses.

Findings and Originality:

The research showed that all drivers of innovation are increasing in their importance to cope with the new requirements resulting from changing customer demands. Available knowledge and information (more important to know what are new demands and how to fulfil them), performance measurement (need for monitoring financial ratios due to higher costs of improved services), HRM systems (need for environment which motivates staff to be innovative and creative), organizational structure (increase the system learning ability), project planning and control (sufficient planning and control of complex processes) and technology (need for implementation to offer services which fit the new demands).

Research impact/limitations:

After pointing out an increasing importance of the drivers in theory the question occurs how important the drivers are in comparison to each other and if a ranking is possible. Since this research did not base on empirical results this question could not be answered but can be a starting point for further research. Thus, an empirical study in general as well as for the special case of Logistics Service Providers would be required in order to estimate the degree of the drivers importance in general and for the logistics industry. This could be a next step in the investigation of innovation drivers in order to increase the success of companies and especially Logistics Service Providers.

Practical impact:

Regarding the practical implications it can be stated that management departments have to focus on the drivers described above in order to increase their innovation capability to cope with the requirements resulting from changing customer demands.

Keywords: Innovation Capability, Logistics Service Providers, Innovation Drivers

Acknowledgement: This research was supported by the German Research Foundation (DFG) as part of the Collaborative Research Centre 637 "Autonomous Cooperating Logistic Processes – A Paradigm Shift and its Limitations".

GLOBAL COMPETITIVENESS OF LOGISTICS INDUSTRY IN DEVELOPING COUNTRIES – A CONCEPTUAL MODEL AND PROPOSITIONS

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ABSTRACT

Purpose of this paper

The purpose of the study is to propose a conceptual model that investigates the issues and challenges facing the developing countries towards achieving the global competitiveness of its logistics industry.

Design/Methodology/Approach

In achieving the objective, this study reviews literature concerning strategies in the development of global competitiveness of the logistics industry followed by preliminary exploratory interviews conducted on the service providers, users and policy makers as well as educators. The model is produced by examining the issues and challenges faced by these parties who involved directly in the logistics industry.

Findings

This study found several key issues that have been the hindrance towards achieving the global efficiency and competitiveness of the industry particularly rooting from operational aspect, service response, information flow as well as the government policies.

Research Limitations/Implications (if applicable)

Despite the remarkable expansion of the industry in Malaysia, studies and publications have been lacking resulting to a very limited dissemination of information for the purpose of coordination, learning and advancement of knowledge. Thus, this study provides a foundation for future researchers to focus at these issues at micro level.

Practical implications (if applicable)

The results provide insights to the practitioners and policy makers on the various issues that need to be dealt at macro and micro level. Wherever possible, guidelines were also provided.

What is original/value of paper?

This paper attempts to open up various issues surrounding this complex and fragmented industry in the developing countries particularly Malaysia. It adds to the body of knowledge by providing a holistic conceptual framework of how developing countries should strategize towards achieving its global competitiveness.

CHARACTERISING THE LOGISTICS SECTOR: WHAT AND WHERE IS THE LOGISTICS-RELATED EMPLOYMENT IN AUSTRALIA?

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ABSTRACT

Purpose: The definition, identification and characterisation of logistics as an industry sector are contentious. In this paper, we set out three research questions: 'what industries represent the logistics sector?' 'What 'logistics functions' does it perform'; and 'what localities do these functions serve?'

Methodology/Design: Using the 4-digit ANZSIC classification employed by ABS (Australian Bureau of Statistics), industries that are explicitly related to logistics are first identified and then aggregated at a small area level. These industries are then compressed into broader functions to characterise the logistics sector using multivariate analysis.

Research Findings: Results show that the total employment at a national level in the logistics sector is 3.57 percent of total employment. Road freight, postal services and air and space transport are identified the major employers of logisticians. Using a factor analysis, four 'logistics functions' were extracted to define the underlying structure of the logistics sector. These functions include: 'road-centred', 'port-centred', 'airport-centred' and 'rail-centred' logistics functions.

Research Limitations: The labour force working as logisticians or supply chain managers in other industries such as manufacturing could not be captured through this data and thus could not be reported in this paper.

Practical Implications: A high degree of functional coherence across factors was observed. This suggests the existence of clustering *vis-à-vis* integration of industries that are inter-related and interdependent. To manage more effectively the distribution of logistics activities, an approach based on the development of regionally integrated logistics systems is advocated so that the diversity, vibrancy and interdependency of the identified logistics clusters can be sustained.

Originality/value of the paper: The attempt to define and characterise the logistics sector at a small area level using the lowest level of industrial classification is the original contribution of this paper.

VECTOR AUTOREGRESSIVE MODEL FOR THE FORECAST OF PORT CONTAINER THROUGHPUTS IN EAST ASIA

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ABSTRACT

Vector autoregressive (VAR) model is an econometric model proved to be a dependable approach to evaluate relationships among time series data. As there is lack of research addressing the issue of container throughput forecast from the perspective of VAR approach, this study would like to investigate this issue through the analysis of the top 5 container ports in East Asia. Our VAR models include the lagged values of container throughputs and gross domestic product for each port. The forecasting accuracy of each container port was compared by mean absolute deviation, mean square deviation, and mean absolute deviation. To avoid the inference bias caused by the financial meltdown in 2008 and 2009, quarterly gross domestic product of Singapore, China, Hong Kong, and Korea and quarterly container throughput of port Singapore, Shanghai, Hong Kong, Shenzhen, and Busan were collected from year 1995 to 2006. Because our findings show no cointegration relationships existing between the container throughputs and the corresponding GDP, VAR model are suitable for throughput forecasting. According to the maximum likelihood estimates of our VAR models, GDP is a leading indicator of container throughput for the ports of Singapore, Hong Kong, and Busan.

Meanwhile, the container throughput of Singapore, Shanghai, and Shenzhen is significantly affected by its lag data. From the perspective of goodness of fit, our models generally provide acceptable results. As the MAPE values for all VAR models are less than 4%, it implies the reliability of VAR approach for the forecast of container throughputs. Comparing to other approaches like regression models or grey models, this study provides an alternative method with dependable predictions but requires less model assumptions. Port authority can easily apply our proposed approach to allocate sufficient port facilities for the upcoming demands.

Future research may apply more advanced econometric models to enhance the prediction accuracy and evaluate which models best describe the processes of container throughputs.

ACHIEVING COMPETITIVENESS THROUGH "LEAGILE" INTERMODAL TRANSPORT SYSTEMS

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Purpose

Intermodal transport has emerged as a solution to provide integrated transport systems by offering more secure transport, lower costs and lower transit times for goods. Despite these advantages, intermodal transport systems do not necessarily meet the expectations of companies aiming to follow the strategies related to agility and leanness concepts. Although very different, the two approaches can complement each other, and a "hybrid" lean/agile strategy can also be adopted. "Leagility" has been defined as the combination of lean and agile systems within a supply chain (Naylor et al., 1997). Agility is observed mainly in the structural differences between intermodal transport systems responding to variations in market conditions and requirements of both shippers and transport service providers. At the same time there is an increasing need to be responsive to any changes in the overall intermodal transport system. On the other hand leanness may be observed when an intermodal transport system aims to offer reduced customer lead times, increased service diversity and elimination of waste (excess inventory or personnel, delays etc.) within the system. In the light of these, the aim of this paper is therefore to address the increasingly important issue of achieving competitiveness in intermodal transport by focusing on both the leanness and agility concepts.

Methodology

This study is based on an extensive literature review on transport modes, intermodal transport and it investigates a specific intermodal transport cost model (Beresford, 1999) according to the ownership, leanness, agility aspects. Also considering base and surge demand as the starting point, three main types of transport flows were adapted from Gattorna and Walters (1996). A conceptual model called "leagile" and competitive intermodal transport system is suggested which includes different variables to be considered for an integrated, customer-focused and competitive transport system.

Findings

Leagility is examined by means of reference to intermodal transport systems as a strategy to achieve competitiveness in the market place. Different transport modes are investigated according to the requirements of lean and agile principles.

Practical implications

This study intends to provide a clear understanding of a possible application of the leagility concept in the intermodal transport chain and practitioners such as logistics companies and forwarders may develop new service offerings to their customers and new ways of achieving competitiveness based on the suggestions from this study. Shippers may also benefit from the findings in terms of adopting themselves to the changing concept of intermodal transport based on leagility.

Originality/Value

Whilst there is a growing recognition of the need to provide totally integrated and sustainable intermodal transport services in order to increase the efficiency of the overall supply chain, there is still limited research into how intermodal transport operations can be improved by considering leanness and agility concepts. This can be considered as the first study in the field which investigates the intermodal transport concept by utilising agility and leanness concepts.

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THE DETERMINANTS OF CONTAINERIZED GRAIN SHIPPING

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ABSTRACT

For bulk shipping industry, ocean freight and charter hire is increased at a rapid speed in the mid 2000s. To reduce shipping cost, grain importers and shippers have begun to employ container vessels to move their freight. However, this change has caused following problems. (1) The number of available empty containers in major grain exporting ports is very limited, (2) Operating efficiency of container terminals in major grain importing ports are deteriorated due to these heavy grain containers jammed in the quayside storage area, (3) As a result of poor ventilation in containers, grain damage ratio is increased from the importers' viewpoint, and (4) Capacity of quayside grain silos is underutilized.

To understand how to minimize the negative impacts resulting from these shippers' demand transition, this study adopts the analytic hierarchy process technique to pinpoint major factors affecting shippers' transportation mode choice behaviour. In addition, fuzzy theory is used to calculate the degree of satisfaction of grain importers on these two grain shipping alternatives, namely, bulk shipping and container shipping.

As the shipping mode choice criteria are concerned, this research finding reveals overall cost factor is the most important criterion influencing grain importers' decision-making behaviour. The top four important sub-criteria are the factors under the overall cost criterion, namely, the market price of goods, stockholding cost, transport cost and the cost of stock in transit. In the cargo quality control criterion, cargo damage ratio is perceived to be the most important sub-criterion. Using fuzzy MCDM technique, the authors find the degree of grain importers' overall satisfaction on bulk carriers' performance is better than on container carriers'. Furthermore, container carriers are perceived to have better performance than bulk carriers on simply the following two sub-criteria, namely, flexible batch size of cargo shipment and flexible dockside storage free time. Understanding the sub-criteria influencing grain importers' transportation mode choice behaviour, container carriers can improve their performance on these sub-criteria and attract grain importers' patronage to improve the containers flow imbalance phenomenon across the Pacific Ocean.

Keywords: Bulker, Container shipping, Grain, Fuzzy AHP

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