

Abstracts of papers presented at the 21st International Symposium on Logistics (ISL 2016)

Sustainable Transport and Supply Chain Innovation

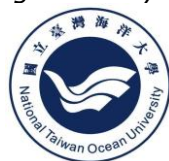
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INTRODUCTION

Once again we are delighted to welcome our friends and colleagues, both old and new, to the 21st International Symposium on Logistics in Kaohsiung, Taiwan. Kaohsiung is a dynamic city with diverse industries (especially in sectors like metal fabrication, electronics, fishing, ship-building and container seaport) and an abundance of natural scenery, beaches and diversified cultures. Considering the location and the global challenges and current trends, we have chosen the theme of "Sustainable Transport and Supply Chain Innovation" for this year's event. We hope this gives participants the opportunity to share and exchange their ideas and views on their current and proposed research work. It also presents an opportunity to engage in various discussions and debates during the course of the event and see how various models, concepts and findings are pushing the frontiers of knowledge in the area of logistics and supply chain. Equally, it is important to explore how the cumulative know-how in our discipline can be successfully applied to develop the next generation of experts through teaching and curriculum development as well as helping the practitioner community to enhance the competitiveness of industry.

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

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

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

- Risk, Disruption and Complexity Management
- Supply Chains and Networks
- Collaboration and Relationships in Supply Chains
- Maritime and Port Logistics
- Transport and Distribution
- Sustainability and Green Logistics
- Knowledge Management and E-Business in Supply Chains
- Value Creation and Customer Service
- Smart Logistics
- Logistics Modelling and Simulation
- Food and Agriculture Logistics
- Supply Chain Performance Management
- Education and Training

To date ISL has been held in Europe, Africa, Australasia and Asia (please see full list below). Following last year's successful event in the historic city of Bologna in Italy, which is also the home to the oldest university in the world, we are very much looking forward to meeting you all at this year's symposium in Kaohsiung, Taiwan.

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

Professor Kulwant S Pawar and Professor Kune Muh Tsai – July 2016

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Section 1: Risk, disruption and complexity management

ASSESSMENT OF POLITICAL DISRUPTIONS ON TEXTILE SUPPLY CHAIN PERFORMANCE

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Abstract

Purpose: This paper explores how political disruptions impact on the performance of supply chain by directly disrupting the supply chain networks of the textile industry in Pakistan.

Design/Methodology/Approach: A qualitative methodology is adopted to explore a deeper understanding of the relationships between political disruptions and textile supply chain performance. Semi-structured interviews are conducted at 25 different textile manufacturing firms. These interviews with senior management have generated rich data to help gaining insights and deeper understanding of the key supply chain issues. Transcript are coded and analysed in NVivo software. Initial results are interpreted using key themes across cases and cross-cases.

Findings: The results of this study confirm the severe impact of political disruptions on supply chain performance. Political disruption however is perceived as a key factor that directly disrupts a supply chain through increased production and delivery lead time, caused transportation delays, interrupted raw material supplies to plants and distributors and constraint access to workers. The evidence presented in this study attests to the negative consequences of political disruptions on supply chain performance, which start to instigate textile firms to adopt off-shoring of textile manufacturing to politically more stable locations such as Bangladesh or India.

Research Limitations: The major limitation is that only textile industry has been used to collect data during interviews. Future research will explore the impact of political disruption on other industry sectors.

Practical Implications: Based on the results of this study, it is argued that supply chain performance is not entirely dependent on improving cost-efficiency of supply chain but it also relies on the stability of political environment, which often cause significant supply chain disruptions. A tri-partite institutional approach between government, industry and community is therefore suggested to deploy strategy to minimise the impact of politically motivated disruptions on supply chains in Pakistan.

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

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

Paper Type: Research Paper

SUPPLY RISK MITIGATION OF SMALL AND MEDIUM ENTERPRISES: A SOCIAL CAPITAL APPROACH

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Abstract

Purpose of this paper

This paper attempts to provide a conceptual framework along with a set of research proposition that depicts how small and medium enterprises (SMEs) can mitigate supply risk by leveraging social capital gained via relationships with their suppliers and peers.

Design/methodology/approach

This paper employs an extensive literature review to reveal the type of network and dimension of social capital that can mitigate the supply risk of SMEs. The framework and research propositions are underpinned and put forward using social capital theory – a long-established concept of strategic management and sociology literature – as a strategic lens.

Findings

The findings suggest that dimensions of social capital in both the buyer–supplier network and the network of peers can play an influential role in mitigating the supply risk of SMEs. However, cooperation among entities in the network mediates the magnitude of the impact of social capital on supply risk.

Research limitations/implications (if applicable)

This research illustrates some links between social capital and supply risk of SMEs. For purpose of comparison, further studies are required to investigate similar links from the perspective of large enterprises. Moreover, these links should be tested empirically in different contexts to enhance generalizability of findings.

Practical implications (if applicable)

Based on the findings of this study, practitioners at SMEs can develop and implement specific policies to leverage a particular type and dimension of social capital to lower supply risk. By investigating the potential of leveraging social capital to mitigate supply risk, this research can assist SME practitioners in improving operational performance of their firms.

What is original/value of paper

This paper puts forward an initial set of propositions to capture the characteristics of relationships between social capital and supply risk. The study supplements the inadequacy in research on using the social capital approach in mitigating supply risk of SMEs.

Keywords: Social capital, Supply risk mitigation, Small and medium enterprises, Literature review

Category of the paper : Conceptual Paper

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TECHNOLOGICAL DISRUPTIONS AND INNOVATIONS AND THE SUPPLY CHAIN

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ABSTRACT

Purpose of this paper: The purpose of this paper is to present a framework of thinking in supply chain innovation through technology disruptions. These technologies will shift the paradigm of global supply chain management.

Design/methodology/approach: We present our argument by examining the existing literature on new technologies through the literature and company websites and other trade materials. We use some examples of companies to validate our assertions. The theoretical scope of the paper is to present some propositions and pose serious research questions for further investigation.

Findings: Our discussions will centre on the impact of the new technologies on supply chain development within the next decade.

Value: The value of this paper serves to present the state of development in various types of technologies and in different industries. Through our paper, we hope to inform both academia and practice of the waves of change that will supply chain development to the next stage of maturity and development, bringing to bear on the new model of doing business globally in a technology connected environment. This work is entirely original.

Research limitations/implications (if applicable): Future research can conduct detailed case studies to examine the cultural shift and interventions that must take place to examine the receptivity of enterprises to new technology adoption and measure their preparedness of such disruptive innovations. Our current research paper has limitations as it is largely conceptual without serious empirical validation across a broad range of industries nor of detailed modelling to understand the systemic implications of technological innovation in the supply chain.

Practical implications (if applicable): The paper can provide useful insights to firms especially domestic small and medium sized enterprises keen to feel the pulse of innovation and transformative technologies in the supply chain.

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ANALYSIS OF THIRD-PARTY LOGISTICS INTEGRATION AND SUPPLY CHAIN RESILIENCE

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Purpose of this paper:

Supply chain resilience (SCR) is essential to the success of firms. However, very few studies have focused on the relationships among the different types of integration, SCR and service performance from the perspective of a third-party logistics provider. This study develops and assesses a conceptual model of these relationships.

Design/methodology/approach:

A total of 161 3PLs (third-party logistics providers) in Taiwan were surveyed and their responses were analyzed using partial least squares structural equation modeling (PLS-SEM/PLS).

Findings:

The responses of respondents demonstrated that, of the three types of integration (internal integration, customer integration and logistics collaborator integration) used by 3PLs, internal integration had the greatest effect on SCR. All three types of integration were found to have fully or partially mediating effects on service performance.

Value:

This study provides useful information on how different types of integration manifest in the SCR and service performance of 3PLs.

Keywords: Supply chain resilience, integration, third-party logistics providers.

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Section 2: Supply chains and networks

3D PRINTING SERVICES AND THEIR IMPACT ON SUPPLY CHAIN CONFIGURATIONS

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Abstract

Purpose of this paper: This paper reports on a study that investigates the current state of the art of 3D printing services in the German, Austria and Swiss Area (known as DACH), as well as the Benelux markets. The aim is to understand the size and composition of the 3D printing industry in these markets, how 3D printing services operate (indicative business models) and the impact they could potentially have on supply chain configurations, both within this industry sector and beyond. In this way, the research has potential to inform how future supply chains are likely to develop and how the industry should respond to these changes in order to secure long term business success.

Design/methodology/approach: The research involves a mixed-methods approach, combining a literature review with desktop research (analysing 3D printing service provider websites and service offerings).

The goals of this project are as follows:

- investigate the size and composition of the 3D printing industry in the DACH and Benelux markets, including types of 3D printing services available in these markets and what differentiates them)
- understand the impact on supply chain configurations resulting from the development of this industry
- evaluate how the identified 3D printing services could or should develop and identify potential future trends

Findings: This research is still in the early phases but nevertheless provides indicators on the current situation of the 3D printing service industry in Europe. Preliminary results indicate that there are over one hundred companies offering such services in the target markets. Services offer a customizable combination of design-related activities (generative services, facilitative services and selective services) and additive manufacturing activities tailored to the customer's needs.

Value: The sheer number of journal articles, books and online information available on 3D printing-related issues indicates that there is a high level of interest in this topic e.g. Berman (2012); Jia et al. (2016) and Rayna et al, (2015), however the majority of research so far has focused on the impact of 3D printing on existing businesses, particularly in manufacturing

activities. More specifically, this is the only study we know of that focuses on the developments of the 3D printing services industry.

Research limitations/implications: To date although the results draw an accurate picture of the current players in 3D printing services, desktop research has its limitations. The next stage will involve a survey and interviews with primary stakeholders (e.g. employees, suppliers, and customers) to gain a deeper understanding of the key current and future requirements of the industry and how this will impact future supply chain configurations.

Practical implications: This research provides a snapshot of the key players in 3D printing services in Western Europe. This will be of interest to industry and academia as a start point to further investigations.

Keywords: 3D printing, supply chain configurations, business models.

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A REVISED BIBLIOGRAPHIC ANALYSIS OF THE LEAN LITERATURE

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Abstract

Purpose of this paper:

As part of an ongoing stream of research into the conception of 'value' within logistics and supply chain management (SCM), the authors presented a working paper at ISL 2015 (Francis *et al.*, 2015) that explored the interpretation of this concept within the Lean paradigm (after Womack and Jones, 1996). Our paper presented an evolving bibliographic analysis (BA) approach. Using that approach, it also identified the 20 most highly cited Lean publications and presented a simple characterisation of them. Using the above as a starting point, the purpose of our ISL'16 paper is to detail a more fully developed BA methodology, and the significantly enhanced characterisation of the Lean literature derived by using it (see following sections).

Design/methodology/approach:

Our BA methodology embodies a multi-stage research design. The first stage involves the use of six key word (KW) phrases to identify relevant publications on the Lean paradigm ('*lean manufacturing*', '*lean production*', '*lean thinking*', '*lean management*', '*value stream*', and '*Toyota*'). Our intent is to identify the top 25 most highly cited publications for each KW search query. The Lean literature is claimed to be *atheoretical* in nature, so the searches are not restricted to journal papers. The KW queries are instead run across two bibliographic database sources that provide such citation statistics: Firstly, GOOGLE SCHOLAR to establish the most highly cited publications generally (books, journal papers, conference papers and reports). Secondly, SCOPUS to triangulate the most highly cited peer reviewed journal papers. The twelve KW queries therefore yield 300 publications when pooled. After duplicates are removed, the remainder are ranked according to their number of citations, and the 50 most highly cited formed into a Focal Population Set (FPS).

Establishment of the FPS marks the start of the second, descriptive analysis stage of the research design. The FPS will be descriptively analysed in various ways to cast insight into the nature and diffusion of the Lean literature (see following section).

Findings:

At the time of writing this project is a work-in-progress. The first stage has been fully completed. The second stage is approximately 80% complete, so it is not possible to yet detail the findings within this abstract. This will be completed by the end of February 2016.

By way of elaboration, the completed analysis stage will cast comprehensive insight into the following aspects of the Top 50 Lean publications identified in the first stage:

- Total citations, rank position within the Top 50, full reference details; publication type; most prevalent and influential authors.
- ABS (2015) analysis (by ABS ranking and subject area of source journal).
- Lean subject focus.
- Research methodology and data collection (incl. research strategy; number and type of data collection instruments used; informant and sample population details; geographical location of source material; industry/ application domain and economic sector type).
- Position/ conclusion on the Lean paradigm expressed within the publication.

Value:

Whilst exhibiting limitations (next), this paper is innovative. The BA methodology represents a methodological contribution that can be applied to the critical analysis of any topic area. Likewise, the descriptive analysis of the Lean literature that [will be] undertaken using this methodology advances knowledge of this continually influential management paradigm.

Research limitations/implications (if applicable):

The main limitation lies in the construct of the KW phrases used in the search strategy. Clearly, the nature of the KW phrases used in the queries will determine the publications subsequently identified and formed into the FPS for analysis. The concept of 'Lean' suffers a notable issue of interpretive viability; ie it means different things to different people. This lack of standard definition therefore poses particular difficulties in forming the KW phrases used to identify the publications that are pertinent to Lean. To help minimise this limitation, six KW phrases were used. The authors have over 50 years of cumulative experience of applied Lean research. A 'sanity check' was therefore applied to the resulting 'hits' to satisfy ourselves that all of the key publications on Lean with which we were personally familiar with were identified by our KW search strategy. They were, but a risk still remains that a highly cited Lean publication(s) were missed.

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A WIREFRAME MANUFACTURER UTILIZING A 3D PRINTING TECHNOLOGY TO THE PRODUCTION SYSTEM: PROSPECTS OF SUCCESS AND FAILURE

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Abstract

Purpose of this paper:

3D printer allows a multi-dimensional replication of a solid object, while it also enables a virtual shape of any item from a digital graphic file. Nakamura (2015, 2014) advanced research focused on investigating cost structure, in-process, and product inventory when introducing 3D printer technology to manufacturing companies. The following issues and considerations are taken from this research:

- i. Scheduling
- ii. Delivery time and place
- iii. Stock levels
- iv. Business management

Currently, research is taking the next step by applying 3D printing in real companies. This paper focuses on a plastic wireframe (PW) company to determine company-specific issues and discuss how the PW company could introduce 3D printing technology. To investigate delivery time and placement of the 3D printing technology, a simulation was conducted to determine a production plan, cost, profit, delivery time, and location. Ultimately, this study discusses the introduction of 3D printing technology in a real company and outlines future problems and possibilities.

Design/methodology/approach:

Figure 1 depicts the model used for this research. First, the PW company receives orders from customers. After receiving these orders, the production booking seat decides on and sends instructions a 3D printing company. At the same time, management calculates and evaluates raw material costs, process and printing costs, delivery costs, a rate of derivative achievement, and a rate for operation.

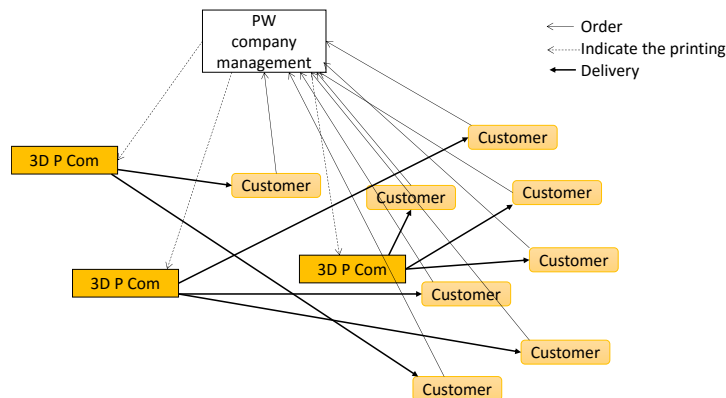


Figure 1: Basic model of the simulation

The evaluation of cost and time uses a matrix formula because it adjusts the IDEF0 process to a mathematical expression and analyses variations in parameters.

Cost matrix as follows:

$$\begin{aligned}
 (C1 \ C2 \ C3) &= \begin{bmatrix} \text{Amount of materials 1} & \text{Processing time 1} & \text{Amount of delivery 1} \\ \text{Amount of materials 2} & \text{Processing time 2} & \text{Amount of delivery 2} \\ \text{Amount of materials 3} & \text{Processing time 3} & \text{Amount of delivery 3} \end{bmatrix} \\
 &\times \begin{bmatrix} \text{Material unit price} \\ \text{Processing unit price} \\ \text{Delivery unit price} \end{bmatrix} \begin{bmatrix} \text{Order volume 1} \\ \text{Order volume 2} \\ \text{Order volume 3} \end{bmatrix}
 \end{aligned}
 \tag{1}$$

Assessment functions of the simulator are from a rate of delivery achievement time and a rate of occupancy. They are as follows:

$$\begin{aligned}
 \text{The rate of delivery} &= \frac{\text{Request delivery time from users}}{\text{Term from the order to delivery}}
 \end{aligned}
 \tag{2}$$

$$\begin{aligned}
 \text{The rate of occupancy} &= \frac{\text{Time of the seating occupancy}}{\text{3D printer's operating time}}
 \end{aligned}
 \tag{3}$$

Findings:

This study examined problems and considerations the PW company may face while introducing 3D printing technology to their manufacturing process. This study reviewed the delivery time and printer location based on a simulation using the production booking seat system. The output of the simulation considered the cost, rate of derivative achievement, and rate of operation using the DEA method. When analysing the rate of derivative achievement, stock views were added to assess the 3D printer's ability to handle rapid growth. Overall, 3D printing is not only a manufacturing innovation but also an innovation that will facilitate significant changes to SCM.

Value:

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

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FROM SUPPLY TO DEMAND TO DEMAND SUPPLY CHAIN MANAGEMENT: A LITERATURE REVIEW

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Abstract

Purpose of this paper:

This paper reviews the literature on supply chain management evolving from supply chain to demand chain to supply demand chain management and contributes a set of findings that capture the state-of-the-art in the field.

Design/methodology/approach:

A literature review approach was adopted to capture, classify and summarize the main body of knowledge on supply chain management. A total of 194 articles published in the last three decades on supply chain management, demand chain management, demand supply chain management and other related topics have been systematically reviewed according to the year of publication and the focus of the study.

Findings:

The findings reveal that majority of the reviewed studies have focused on supply chain structure and design, strategy and policy formulation, supply chain integration, relationship maintenance, and role and significance of information technology in supply chain management. The review also shows that, to adapt to the ever changing business environment and advancement in technology, design and management of a supply chain has gone through a few major changes in focus ranging from cost cutting to value creation to total integration. Supply chain design has evolved from the product categorization approach, the one-size-fits-all lean or agile solution, to the latest dynamic network alignment model. Similarly, research on managing a supply chain has also undergone a few paradigm shifts with the attention placed mainly on the supply side (supply chain management) at the beginning, then on the demand side (demand chain management), and lately on integration and alignment of all involved business functions (demand supply management).

Value:

This study provides valuable reference to researchers who wish to understand the development of research in supply chain management. It summarizes the major changes in focus of investigation and highlights the latest trends in research. The study also reveals the less investigated areas and approaches in this field which could provide rich opportunities for further exploration.

Research limitations/implications (if applicable):

Despite a vast body of literature on supply chain management, a systematic review and analysis of its path of development in research is still lacking. Although primarily a desktop research, this study attempts to address the aforementioned inadequacy by comprehensively reviewing the related literature to identify trends and gaps so as to provide rich opportunities for further exploration in this discipline.

Practical implications (if applicable):

The findings may provide valuable reference and guideline to practitioners in the supply chain management community who wish to make reference to the latest perspective in supply chain studies to assist them in strategy formulation and decision making.

Keywords:

Supply chain design, supply chain management, demand chain management, demand supply chain management, literature review

Category of the Paper:

Literature review

References:

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A HOLISTIC PERSPECTIVE ON SUSTAINABLE PROCUREMENT IMPLEMENTATION

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Abstract

Purpose of this paper:

Implementing sustainability has become necessity to stay competitive in the globalised business. Procurement is seen to be a strategic function, which can integrate sustainability across the supply network. The research aims to identify key factors influencing successful implementation of sustainable procurement practice across the network. Following systems thinking approach, research attempts to develop a conceptual model for sustainable procurement implementation.

Design/methodology/approach:

An exploratory study following systems thinking approach understands the drivers, barriers and challenges to the '*triple bottom line*' within procurement. Secondary data on 105 global firms' practices in procurement is collected for the study. The qualitative data is analysed following holistic and critical thinking approach. Causal linkages between different factors support in developing a conceptual model.

Findings:

The research identifies corporate environmental awareness and commitment of top management as the key drivers for implementing sustainable procurement practices within supply chain network. The conceptual model identifies three broad categories of drivers along with barriers for the potential adaptation.

Value:

The research studies causal relationships between different factors influencing the sustainable procurement. The paper attempts to provide exploratory perspective on social, environmental and economic issues within procurement function.

Research implications:

The research attempts to provide holistic and systematic approach to implementing sustainable procurement across supply network. Comprehensive framework from the conceptual model can be developed for successful implementation of sustainability practices within procurement.

Practical implications:

The research will support practitioners in understanding the barriers, challenges and opportunities in sustainable procurement. A holistic study is expected provide new insights.

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THE ROLE OF TECHNOLOGY IN OUTSOURCING PRACTICES IN NIGERIAN OIL AND GAS INDUSTRY

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Abstract

Purpose - The purpose of this research is to assess the current state of outsourcing practices in Nigerian oil and gas industry and examine the impacts of technology on firm's geographical scope of outsourcing operations.

Design/Methodology/Approach – A mixed method approach involving a combination of questionnaire and semi-structure interview. The data collected provides a cross-sectional study of 200 oil and gas companies with senior level managers and supply chain experts as the respondents. We have asked the respondents to provide their own perception on how technological capabilities have impacted their organisational outsourcing practices and performance.

Finding - The research revealed that there are many beneficiary role of technology in outsourcing practices in terms of driving new business concepts and performance, such as business process re-engineering, organisational restructuring, benchmarking, alliance and lean management.

Originality/Value – This paper is different from other previous studies in outsourcing industries that focused on discrete manufacturing whereas the oil and gas sector is process oriented and offer a different operational environment for outsourcing practices. There is also limited literature that explained the impacts of technology on the outsourcing practices in a developing economy.

Practical/theoretical applications – The results could be used by outsourcing organisations as a decision support enabler in processing the value of their intellectual assets in making strategic and tactical decision and sharing problems effectively. The outcome could also support organisation's general knowledge from both internal and external source, uncover relationships between the tangible and intangible, the tacit and explicit.

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Section 3: Collaboration and relationships in supply chains Supply chains and networks

EXAMINING SUPPLIER-SIDE QUALITY MANAGEMENT IN THE CHINESE AUTOMOBILE MARKET

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Abstract

Purpose of this paper:

Since 2009, China has become the world's largest automobile producer and market. As the assembler is normally in charge of assembling and stamping works, the supply of components becomes a fundamental process of ensuring desirable quality. Supplier-Side Quality Management (SSQM) practices vary, among others, by business structure and supply chain position (Dellana and Kros, 2014). However, the dynamics of SSQM have mainly been empirically researched on buyers and suppliers that are typically not related in some forms of an identifiable direct exchange (Ambrose et al., 2010). In order to fill this gap, we aimed to compare two dyadic relationships: one Chinese Self-Owned Brand (CSB) (and one of its suppliers) with one Chinese-Japanese Joint Venture (CJJV) (and one of its suppliers) by analysing their SSQM practices and performances. This comparative study aims to answer two research questions: 1) How do SSQM practices differ? 2) Why do such differences occur?

Design/methodology/approach:

In order to answer our research questions, case study was employed (Yin, 2013). Data was collected from semi-structured interviews, company documents, and observations to enhance data triangulation. An interview protocol was developed from the review of relevant literature, and a systematic data analysis process was employed, on both the within and the cross case levels.

Findings:

Our research elaborates on the differences between operations capability and quality culture aspect in supply chain relationships in the Chinese automobile market. The comparison also reveals the diverse operational and strategic SSQM practices in supplier selection, supplier support, supplier communication, and supplier involvement. Based on these findings, a comprehensive framework is developed to assist in better understanding SSQM in China.

Value:

This comparative study empirically investigates the SSQM of buyer and supplier in the same relationship, and contributes to academic understanding of relevant factors in the Chinese automobile industry. It also provides insights into the expectations and perceptions of relationship partners. Moreover, this research should help managers in recognising best practices in SSQM and in identifying improvement directions.

Research limitations/implications (if applicable):

This research focused on two dyadic relationships (i.e. CSB-Supplier; CJJV-Supplier); therefore, more relationships with diverse characteristics should be included into future research. Furthermore, to test the generalizability of the results, other methodological approaches such as a large survey could also be conducted.

Practical implications (if applicable):

This paper provides empirical evidence explaining how and why CSB differs from CJJV in SSQM to quality and supply chain managers. Moreover, firms need to recognise their capability and quality culture and act accordingly.

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HOW SUPPLIER SELECTION CRITERIA AFFECTS BUSINESS PERFORMANCE? A STUDY OF UK AUTOMOTIVE SECTOR

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Abstract

Purpose of this paper:

According to KPMG international (2015), global sales of automobiles are forecasted to reach 73.9 million vehicles and expected to hit 100 million units in the next two years. This shows that automotive sector has a tremendous growth potential and UK automotive sector is no different. However, in recent years the growing environmental awareness has become a major concern for automotive sector as they are faced with pressure of reducing carbon emissions as well as the costs. Suppliers play a significant role in achieving environmental goals set by organisations. Under these circumstances it is worth exploring the criteria that are used in assessing suppliers including the green aspects and how that affects the business performance.

Design/methodology/approach:

This research adopts a mixed method research approach. In order to collect the quantitative data a survey questionnaire was constructed and sent to automotive businesses listed in the FAME database. In order to triangulate the findings of this study, survey was complemented with in-depth interviews. Around 100 automotive manufacturers were invited for the survey however only 38 usable responses were received. In total seven semi-structured interviews were also conducted with people from different backgrounds and work experiences in the automotive sector.

Findings:

Literature identified delivery, cost, quality and technology as the supplier assessment criteria commonly used in assessing suppliers in automotive industries. Yet the issue of culture and green supply chain practices (GSP) were also widely concerned in several studies. The data analysis showed that delivery, quality, cost, technology, culture are correlated with exception of green supply chain practices. GSP was only found to be correlated with technology and cultural criteria. Semi-structured interviews suggest delivery and quality as the most

important criteria when assessing supplier because of their greater impact toward business performance and reputation. Findings from all respondents also showed that most automotive manufacturers have already adopted environmental competency in their criteria. However, interviewees mentioned that this criterion does not take a major role in assessment compared with other criteria. The results also indicate that all factors studied do affect the business performance of automotive organisations.

Value:

This study contributes to the limited literature focused on assessing supplier selection criteria and business performance linkage in the UK automotive organisations. In addition, most studies on supplier selection and business performance ignore the green practices as important criteria which this study aims to address.

Research limitations/implications:

The study is based on the findings from a limited survey responses and semi-structured interviews. Having larger sample population would certainly improve the validity of the findings. The perspective of SMEs and large businesses with regard to each supplier selection criterion may be different hence the future research in this domain would also provide some valuable contributions.

Practical implications:

The survey responses indicate green supply practices as one of the important criteria in supplier selection. This suggests that automotive manufacturers should realize the importance of green practices while selecting their suppliers. This will help them to meet their own green goals while simultaneously meeting the government environmental regulations.

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THE IMPACT OF OWNERSHIP TYPE ON THE INTERRELATIONSHIPS BETWEEN BUSINESS PROCESS MANAGEMENT, SUPPLY CHAIN COLLABORATION, COLLABORATIVE ADVANTAGE AND ORGANISATIONAL PERFORMANCE

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Abstract

Purpose of this paper:

To ensure that a company achieves competitive advantage and enhanced performance levels, the link associated with a firm and Supply Chain (SC) members is considered as one of the main enablers (Pradabwong *et al.*, 2015). A growing number of literature has examined the relationship between ownership types and firm performance (e.g., Lefort and Urzua, 2008; Jiang *et al.*, 2013). The previous stage of our research confirmed that there are positive relationships between Business Process Management (BPM), Supply Chain Collaboration (SCC), collaborative advantage and organisational performance. Nevertheless, there is a lack of empirical research elaborating on the impact the type of ownership has on the interrelationship between the competitive and performance linkages on both the individual operation and the SC.

This paper aims to examine how the type of ownership relates to intra- and inter-organisational practices. We divided ownership into three categories: Thai owned, joint venture and foreign owned companies. Subsequently, we empirically tested the hypothesis regarding the moderating impact of the type of ownership on the interrelationships between BPM, SCC, collaborative advantage and organisational performance.

Design/methodology/approach:

A theoretical model for explaining the moderating impact of the type of ownership on the interrelationships under investigation was developed. Both online and postal surveys were used for a large-scale survey data collection phase from both medium and large manufacturing firms in Thailand. The hypothesis testing phase that followed was performed by means of the Structural Equation Modelling method.

Findings:

The results indicate that the interrelationships between BPM, SCC, collaborative advantage and organisational performance are partially moderated by ownership types. This allows to elaborate on and discuss how the interrelationships under investigation vary for the respective types of ownership.

Value:

This study provides empirical evidence on the impact of different types of ownerships on the intra- and inter-organisational practices by using the data from various manufacturing sectors in Thailand. The results provide insights into how to improve intra-and inter-organisational practices, especially with regards to different type of ownerships, and how to improve firms' performance and to maximise value.

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EVALUATING THE ROLE OF GUANXI IN SUSTAINABLE SUPPLY CHAIN MANAGEMENT PRACTICES AND PERFORMANCE

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Abstract

Purpose of this paper:

Interpersonal relationships, such as guanxi, have been identified as having an important role in supply chain management (SCM). They have been studied to enhance economic performance of a wide range of supply chains (Lee and Humphreys, 2006). However, to sustain economic outcomes, environmental and social corporate responsibility have become emerging topics. Even though researchers have started to examine guanxi as a mediator for green supply chain initiatives (Luo et al., 2014), it is pertinent to consider the impacts of guanxi on the three pillars of sustainability in the context of SCM. Therefore, the aim of this study is to address this research gap by evaluating the relationships between guanxi and sustainable supply chain management (SSCM) with empirical data.

Design/methodology/approach:

By adopting social network theory, a conceptual framework was built in AMOS and the questionnaire was designed to examine the relationships between guanxi with buyers and sellers, and the impacts on supply chain capitals, SSCM and SSCP. Then the online questionnaire was designed accordingly and was sent out to practitioners doing business related to SCM. Finally, 590 responses have been collected achieving a 23% response rate. After checking the data validity and duplication, 477 usable questionnaires were analyzed with structural equation modeling using AMOS, to evaluate a set of covariance relationships between the variables.

Findings:

The research shows that guanxi networks positively increase financial, human and social capitals, which in turn encourages supply chain practices and improved SSCP. The size of the network also appears to have an impact.

Value:

The main contribution to knowledge that our research offers is a thorough evaluation of the relationships between guanxi and SSCM, simultaneously considering economic, environmental and social responsibilities. It also helps to understand SSCM empirically from a social system perspective.

Research limitations/implications:

Because guanxi is socially constructed, to more deeply understand their underlying mechanisms, further qualitative studies are encouraged. Further, the sample shows a geographical focus of the responses in the south of China yet different regions could emphasize various levels of guanxi.

Practical implications:

The study reveals different levels of involvements with guanxi and social network in different industries, firm sizes and firm types. Therefore, accordingly, companies can invest in building and maintaining guanxi networks which influence their SSCP, in order to gain maximum benefits for SSCM from these networks.

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USING SENSORS TO SUPPLEMENT PARTNER TRUST IN COLLABORATIVE TRANSPORT

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Abstract

Purpose of this paper:

The lack of trust among partners in transport logistics is constituted by many factors, including “collaborative processes –information sharing, incentive schemes and decision synchronization”[1], and environments. In addition, there are many new and dynamic actors, entering and leaving the community, such that establishing trustworthiness is challenging. Moreover, networked society repudiates usage of traditional physical cues of trust and reputation in humans and organizations. Meanwhile, trust related mechanism like security mechanisms are inadequate to compensate or substitute lacking physical cues. This deficiency grounds to the reality that security mechanisms are designed to protect computer resources against malicious agents. Partner’s trust is above protection against loss because partners are curious on assured confidently that a trustee partner will behave in their expectation. Rendering this confidence by applying “security mechanisms: confidentiality, availability and integrity of data or information”[2] is less than enough. Collaborating partners require soft trust, being reliability, confidence and assurance [2] in entities they interact and deal with. They need to trust people, organizations, data and information sources, personal assistants and processes [2, 3]. For example, if information providers act deceitfully by providing false or misleading information, traditional security mechanisms are unable to protect against this type of threat [4]. The major concern is: how to establish required soft-trust in place of physical cues of trust in environments where physical processes are seamlessly linked with virtual world –the CPS. This paper investigate how sensor already used as a part of a IoT based solution, can be used for improving partners trust and suggests a framework for how to implement this.

Design/methodology/approach:

The main objective of our study is two-folded, thus also the methodological approach is based on combination of the research methods:

A structured literature was carried out according to [4]. The keywords used in finding the literatures are derived from previous research related to trust in collaborative networks, including those in supply chain and logistics, CPS and IoT

The databases used in this work originate from catalogs from a German University and online databases which identified relevant in these fields such as Science Direct, IEEE etc. The second part of the work is based on action based research. The work with the framework had a different methodical approach. Design Science was the overall scientific approach in this work. More specific, action research was applied.

Findings:

Social reputation systems and controls are widely known about vital roles they play in societies. In traditional society, physical cues of reputation and trust were applied to build profile of community members, especially in small geographical areas. However, ICTs have led to the emergence of several new organizational forms, creating dynamic, strategic networks of individuals and small firms (Mulligan 2014) to share inefficiently utilized resources. While it is difficult to establish trust in collaborating partners, application of the analogy of the traditional society to networked society is prominent. It is a supplementary approach on top of computational security mechanisms and online reputation systems, to help partners explore further trust and reputation cues equivalent to physical ones in traditional society.

Value:

This research has proposed a soft sensor approach to mediate trusting in partners of vehicle sharing. The approach applies benefits of CPS: social media and online community to further verify partner reputation and trust. Its conception grounds in the reality that, mostly friends connect to people with similar interests and behaviors. Tweets of the subject partner and connected friends constitute base data and information towards understanding partner trust. Therefore ad hoc verification via partner's own profile and connected friends help establishing trust prior to engagement. Finally, this work has contributed more on small-scale vehicle sharing -ride sharing. Further work is needed to explore how CPS soft sensors can be applied to building trust in partners sharing vehicle in large scale -vehicle trucks.

Research limitations/implications:

The framework is has not been properly validated yet.

Practical implications:

The paper indicates how trust among partners within transport can be improved by using soft sensor data in addition to security mechanisms.

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DO BUYERS AND SUPPLIERS BEHAVE DIFFERENTLY IN THEIR EXCHANGE RELATIONSHIP AT DIFFERENT STAGES OF THE RELATIONSHIP LIFE-CYCLE?

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Abstract

Purpose of this paper:

Studies on the behavioural differences between buyers and suppliers in their exchange relationships are increasing. How these differences vary across the relationship life cycle, however, remains less well understood. Because business interactions between exchange partners are context dependent, the level of efforts exchange partners put into building their relationship also change over time. This paper examines the behavioural differences between farmers and farm produce buyers with respect to six constructs – use of contracts, transaction-specific investments, trust, cooperative norms, social bonds and long-term orientation – across the first three stages of their relationship life-cycle.

Design/methodology/approach:

Data for this study came from two separate surveys – a farmer survey (i.e., suppliers), and a trader (i.e., buyer) survey – conducted in two strategic agribusiness regions of Vietnam: the Central Highlands and South-Central Vietnam. Behavioural differences between farmers and traders with respect to the six constructs at the exploration, extension, and maturity phases of their relationship life-cycle were tested using two-sample t-test.

Findings:

Except for social bonds, farmers and traders behave rather similarly toward each other during the exploration phase. Major differences surface during the extension stage. Farmers have a preference toward use of contract; traders do not. Farmers do not trust traders as much as the latter trust them. Traders, however, are more forthcoming in observing cooperative norms and hold a long-term orientation toward the exchange relationship. They also give stronger social support to farmers than what they receive from the latter in return. As their exchange relationship matures, both traders and farmers deemphasize the use of contract and hold comparable level of trust for each other. Yet traders continue to offer more social support and maintain a stronger long-term orientation than farmers.

Value:

Our findings suggest that trust asymmetry between buyers and suppliers could be transformed. If the more trusting partner could show altruism in other aspects, including offering strong social support to the less trusting partner, asymmetric trust could be nurtured into reciprocal trust, eventuating into mutual trust.

Research limitations/implications (if applicable):

This study paves the way for more in-depth investigations of asymmetric trust and the factors and contexts surrounding its existence, including its possible transformation into reciprocal and mutual trust.

Practical implications (if applicable):

This study offers practical insights into how trust asymmetry may be transformed in an exchange relationship.

Key Words:

Buyer-supplier relationship; Relationship life-cycle; Trust; Farmers and traders; Vietnam

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Section 4: Maritime and port logistics

AN EXPLORATION OF RELATIONSHIP STRENGTH IN MARITIME LOGISTICS NETWORKS BY SOCIAL NETWORK ANALYSIS

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Abstract

Purpose of this paper:

Management of buyer-supplier relationships is central to the success of supply chains. As supply chains become more global, so maritime logistics plays an increasingly critical but often unnoticed role. Therefore, it is important to study the inter-organizational relationships in maritime logistics network (comprising the cargo owner, freight forwarder, shipping carrier and port operator). The dominant consideration of relationship management research in maritime logistics has been focused on a dyadic level, but few have looked at this issue from a network view. Therefore, this paper aims to explore the relationship structure of the main players in the maritime logistics network using social network analysis.

Design/methodology/approach:

A questionnaire survey was used to measure six dimensions of relationship strength among each of the main players in the maritime network in Taiwan, together with different levels of service complexity, and the value generated by the network. In total, 248 responses were obtained. Social network analysis (SNA), which is suggested being useful to supply chain researchers in further elaborating the potential of the network concept (Borgatti and Li, 2009) was applied to analyse the data. Through this, the position of each player, the relationship strength among them and the degree of supply chain integration in the network was identified.

Findings:

The major findings show that the links between cargo owner-port operator and freight forwarder-port operator are relatively very weak, and the links between shipping carrier-port operator, shipping carrier-cargo owner, and shipping carrier- freight forwarder are stronger. On the other hand, the shipping carrier is most embedded into the maritime logistics network, which shows the importance of its role as an integrator. These results give more objective evidence for the dominant position of shipping carrier (Ng, 2012) and the passive, double-derived demand role of the port operator in the maritime logistics network (Paixao and Marlow, 2003).

Value:

Social network analysis has not seen significant use in logistics research to date. Through this novel method, the outcomes of relationship structures in a maritime context were demonstrated by visual and quantitative ways, which can provide a foundation for industry to find the potential markets, work out new business models, and develop effective and efficient collaborative and integration strategies with other trading players in networks. Moreover, the results also benefit policy makers by demonstrating the structure of the maritime logistics industry in order to design policies fit for purpose.

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SMOOTHING CAPACITY UTILISATION IN MARITIME LOGISTICS NETWORKS

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Abstract

Purpose of this paper:

The container shipping industry requires large capital investments, such as container ships and port facilities. In order to secure adequate and reasonable returns on investments, there needs to be a degree of stability in the maritime part of the international supply chain, especially after the global financial crisis of 2008 (Mason and Nair, 2013).

Although the container shipping industry has been undertaking several strategies to smooth capacity utilisation, the theoretical supports from academia are still limited. Maritime reflections of the uneven capacity utilisation in the literature consider the importance of a seamless information flow without time delays in order to moderate the capacity issue (Elbert et al., 2010). However, there are established theories and practices in the field of operations and supply chain management, discussing the approaches to smooth capacity utilisation. As shipping carriers are most embedded into the maritime logistics network, playing an important role as an integrator in the maritime logistics network (Lin, 2015), this paper aims to explore their service capacity utilisation issue through operations and supply chain management theories.

Design/methodology/approach:

Case studies comprising interviews with professionals and secondary data collecting from documents and leading shipping database were conducted in this research. Based on the theories in operations and supply chain management, we use analogy to identify the emerging and potential strategies for shipping carriers to smooth capacity utilisation.

Findings:

Regarding to the strategy of horizontal integration, evidences shows that the formation of mergers, acquisitions and strategic alliances between shipping carriers fits the concept of reducing the unevenness of capacity utilisation. So does the establishment of trunk-and-feeder system, which creates a hierarchy of hub and feeder ports. In terms of the strategy of vertical integration, not only through the operation of dedicated terminals in port area, but also through the provision of integrated logistics and intermodal services by themselves or with other stakeholders in container maritime logistics networks could be considered by shipping carriers. Within this part, the strategies of adjusting vessel allocations in different shipping routes between peak and off-peak seasons, integrating warehousing function and sharing information with cargo owners are suggested.

Value:

There are quite a few studies looking at the service strategies of shipping carriers from shipping economics discipline, but only little research such as this one attempting to analyse the issue from the lens of supply chain and operations management to date. Moreover, through applying the theories in operations and supply chain management, the more comprehensive solutions of smoothing capacity utilisation in the container shipping industry could be proposed, which could help to moderate this volatility and maximize vessel utilisation rates. This is significant for shipping carriers to survive in such competitive and challenging era. Therefore, this paper contributes to academia and have an impact on industry.

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THE DEVELOPMENT OF A CONTAINER PORT SELECTION INDEX IN EAST MEDITERRANEAN USING A FUZZY AHP APPROACH FOR

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ABSTRACT

Competition between ports receiving container ships has started to attract more clients such as freight forwarders, importers, exporters, shipping lines, ship owners and logistics service providers. Container terminals play a substantial role in global cargo transportation by serving as an intermodal between the maritime and by a variety of carriers. This paper aims to investigate those criteria that can be applied by port clients (shipping lines only) when they select their calling ports. A questionnaire has been developed to identify those criteria that are currently applied by shipping lines in the container market in calling seven ports East Mediterranean region. Data and answers are collected for this questionnaire and in turns they have been compared with those criteria discussed in the available literature. Several interviews have been conducted with different shipping lines working in the east Mediterranean region in order to select the most important criteria from their perspective. The most important criteria identified by shipping lines are grouped into seven categories. Fuzzy AHP approach is applied to weight each criterion. The results were distributed again in a second questionnaire to the experts and academics in the field to highlight the basic criteria from their perspective. Finally, the results of both questionnaires are given weight for each criterion through the AHP method of analysis and K-firm concentration ratio. A ranking index of ports is developed based on the criteria identified by the shipping lines. It is concluded that the port charges criteria was the highest measure that is currently applied by the shipping lines in East Mediterranean container market.

THE ROLES OF INTERMEDIARIES IN AUGMENTING SHIPPERS' SATISFACTION WITH CONTAINER SHIPPING

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Abstract

Purpose of this paper:

Increasing importance of the international shipping has signified the roles of intermediaries for enhanced international logistics services. As Marlow and Nair (2008) pointed out, liner companies providing multimodal point-to-point services are engaged in the direct competition with intermediaries, such as freight forwarders, NVOCCs and 3PL companies. These intermediaries transform a basic transport service offered by liner companies into a new value-added logistics service, thus increase overall satisfaction with container shipping. This research aims at highlighting the influences of intermediaries on the satisfaction of shippers with container shipping. It compares the perception between a shipper group directly using liner companies and another shipper group using intermediaries in order to identify the logistics service factors that intermediaries make a great contribution to the service level.

Design/methodology/approach:

A large-scale questionnaire survey with shippers was adopted to collect empirical data. Questionnaires were distributed to 300 Korean shippers who are involved in international logistics. The construct model of logistics service factors derived from Lu (2000) were tested by confirmatory factor analysis. Critical service factors were identified by multi-stage analyses which combined multi-group analysis, analytic hierarchy process and the model developed by Aaker and Day (1980).

Findings:

Intermediaries were found to be superior in terms of Easy Process and Value-added Service factors while liner companies had competitive edges in Equipment & Facilities and Image & Promotion factors. Although the perception of relative importance differed between the respondent groups, the intermediary users prioritise Freight Rate, Speed & Reliability and Sales Representative Factors to other factors. Overall weighted index of satisfaction showed that the influences of Process Easiness and Value-added Service factors definitely exist but might be limited. A further analysis using the Aaker and Day Model revealed that Freight Rate and Sales Representative factors emerged as the most influential factors to augment the satisfaction of shippers with liner services through intermediaries.

Value:

Despite the myriad studies on criteria for selecting carriers, there has been little empirical research relating to intermediaries' influences on liner service satisfaction. This research is the first study to highlight the roles of intermediaries by considering multi-faceted logistics service attributes to shippers' satisfaction with liner services.

Research limitations/implications:

This research provided several theoretical contributions by validating a construct model of logistics service attributes and by analysing the attributes by a combination of quantitative methods.

Practical implications:

The results emphasised the current competitive advantages of intermediaries and their strategic directions in the future. These will be also useful for liner companies to provide better services to their direct shippers.

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IMPLICATION OF SERVICE IN SHORT SEA SHIPPING

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ABSTRACT

The attributes of a service can be categorized as service quality and service preference. While studies have addressed the importance of service quality and perceived value, the service preference of shippers and its relationship to perceived value and purchase intentions remain unexplored. Therefore, this study proposes a causal model in the context of coastal shipping services to investigate the influence of purchase intention through the shipper's service preference and perceived value. We apply structural equation modeling to assess the empirical strength of the relationships in the proposed model. The model is validated through empirical testing. Our results show that for short sea shipping, timing-related services, price-related services, warehousing services, sales services, door-to-door services, information services, and advertising services positively affect service preference.

Key Words: Service preference, Perceived value, Purchase intention, Coastal shipping

MEASURING MARITIME CARBON-FOOTPRINT: A VESSEL-RATING APPROACH

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ABSTRACT

Purpose of this paper

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

This paper addresses the measurement of carbon footprint of maritime supply chains. The research is based on a real life case study with container import flows from a UK leader in retail distribution, and its logistics partners. The originality of this work is that it investigates two aspects of maritime carbon footprint: the evolution and diversity for emission factors data, the measurement at the vessel level and its general implications.

Design/methodology/approach

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

Methodology is based on a case study, with some generalisation when possible. Authors used four emission factors sources: IMO (2009), RightShip (2013), Clean Cargo Working Group (2013), and UCL (2015). The latter was produced for the IMO 3rd GHG Study. Authors measure the impact of different data sources on total emissions and modal transfer decisions. Also, differently from other research works that focus either on ports & hinterland optimisation or vessel routing; this research focuses on purchase order postponing and/or re-routeing towards cleaner vessels, considering the vessel schedule as given.

Findings

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

Research conclude that discrepancies between results could reach up to 69% depending on the data or methodology used. However this difference wouldn't have an impact on the modal choice decisions used for this case study. Authors illustrated situations where this would not be the case. Also, the purchase order re-routeing algorithm shows a potential reduction of carbon footprint in the sample of 13.6% (if using the same route) and 14.4% (if allowing alternative port of arrival in the UK). Study shows that in most cases the choice of the vessel had more significance than the choice of the arrival port in the UK. A mathematical relationship defining the payback distance where this assertion is valid has been developed and applied.

Value

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

Traditionally, in the container sector, shippers do not focus on the vessel used for each voyage but on the best of the average fleet performance of the vessel company. This research shows the possibilities of making of such choice during the ordering process. Also the paper illustrates the intrinsic uncertainties on all CO₂ measurements based on emission factors. Finally, it shows the impact of mixing CCWG, and IMO/EVDI data to benchmark a fleet performance.

Research limitations/implications

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

The limitation of this work is that the emission factor used at the vessel level uses design data (EVDI) rather than actual marginal impact on the fuel consumption. Potentially the future MRE regulation could provide more accurate data. Another potential impact of a broader use of independent vessel-rating approach is that shipping companies would have a more direct motivation in using more energy efficient fleets.

Practical implications

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

This research has considered the practical implications of implementing this ordering process as most of the data are already available in the current information systems. Also, in order to minimise the impact on inventory management, the re-routeing algorithm only modifies order dates within a range smaller or equal to a week.

References

For working paper submissions only, please provide THREE relevant references.

RightShip, 2013. Calculating and comparing CO2 emissions from the global maritime fleet. May 2013, RightShip, London.

Rigot-Muller, P., Lalwani, C., Mangan, J., Gregory, O., Gibbs, D., 2013. Optimising end-to-end maritime supply chains: a carbon footprint perspective. *The International Journal of Logistics Management*, Vol. 24, No3, pp. 407-425.

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Section 5: Transport and Distribution

Maritime and Port logistics

OPTIMAL DELIVERY POSTPONEMENT STRATEGIES IN DEADLINE ORIENTED LAST-MILE LOGISTICS

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Category: Research paper.

Abstract

Purpose of this paper:

Delivery time guarantee has become a common marketing strategy for retailers. For example, Amazon offers "Get it Today" to its customers when they place their orders by a certain cutoff time. While offering a guaranteed delivery requires an immediate shipment, offering such service must be tempered by the need to provide service at low cost. Postponing the truck dispatch allows shipment consolidation across time which leads to a lower delivery cost due to economies of scale; however, longer distances traveled and compensations are often results of late dispatches. In this paper, we address the "postponement problem," in which marketing and operational decisions are linked.

Design/methodology/approach:

We consider systems in which a continuous flow of customer orders having a certain deadline is accumulated and dispatched together. We develop analytical models to determine optimal timing of shipments for retailers which perform last-mile deliveries in deadline-oriented environments. We also simulated a set of deadline oriented last-mile logistics systems to assess how much our approximations and the overall cost vary from the solution in which the truck follows an optimal route.

Findings:

Computational results reveal a substantial cost saving of about 18.7%, in addition to 16.8%, and 7% improvement in the service level and truck utilization, as a consequence of implementing the optimal postponement strategy compared to intuitive policies.

Value:

To the best of our knowledge, the present paper is the first to address the time based shipment consolidation strategy in a deadline oriented environment.

Research limitations/implications (if applicable):

Our models determine the best postponement strategy by finding the optimal dispatching times for a given set of cost and other operating parameters; however, they only consider a single truck serving the service area. That is, how to model problems with multiple delivery trucks in the same service area remains as a future extension.

Practical implications (if applicable):

For retailers which perform their last-mile deliveries against a daily deadline, postponing truck dispatching times is critical. Because the cost associated with transportation, lost sales and late deliveries can be expressed as a function of dispatching times, it directly determines the success of business. Although intuition might suggest that finding the optimal timing of a

single dispatch is straightforward, we showed that it requires substantial effort, due to the non-convexity of the objective function. Nevertheless, we have derived closed form expressions of the optimal timing of a single dispatch by taking the advantage of objective function's piecewise structure.

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LOCATING ALTERNATIVE FUEL REFUELING STATIONS TO MINIMIZE DRIVERS' DEVIATIONS FROM THEIR PLANNED ROUTES

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Abstract

Purpose of this paper:

The use of alt-fuel vehicles (AFVs) is currently inconvenient for drivers because of their limited driving range and the scarcity of refueling stations. Due to such limitations, drivers may need to deviate from their normal routes for refueling in order to complete longer trips. A number of flow demand-based refueling station location models have been proposed in the literature to minimize the total construction cost of alt-fuel refueling stations (AFSs) to service all Origin-Destination (O-D) trips (using set-coverage models) or maximize the coverage of O-D flows for a given p stations (using maximum-coverage models). However, the inconvenience and energy loss incurred by the deviations made for refueling suggest that the minimization of such deviations might be desirable. This paper thus presents a link-based alt-fuel refueling station location model to objectively minimize the maximum percentage of deviations of all O-D trips within a transportation network.

Design/methodology/approach:

The research problem reduces to a range-limited shortest feasible path subproblem if the locations of the stations are given. We develop a non-dominate labeling reachable shortest path algorithm to solve the subproblem. It is embedded in the implicit enumeration algorithm to exactly solve the model.

Findings:

The results of numerical experiments show that the exact algorithm performs well. The tradeoff graph between the number of stations and maximum percentage of deviations indicates that increasing the number of AFSs in adequate locations can decrease the driver's maximum percentage of deviations without increasing the vehicle's range. This practice may be important for promoting AFVs, especially when the improvement of the AFVs' range is expensive and challenging for manufacturers.

Value:

To best of our knowledge, it appears that no work in the literature aims to directly and solely minimize the inconvenience and energy loss incurred by the deviations needed for refueling, and thus we propose a link-based model to locate AFSs to objectively minimize the maximum percentage of deviations of all O-D trips within a transportation network. Moreover, we develop a non-dominate labeling reachable shortest path algorithm embedded in the implicit enumeration algorithm to exactly solve the model.

AIR FREIGHT HUB COMPETITION WITH AIRPORT DEMAND ENHANCING SERVICES

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Abstract

Purpose: Competition for market share among the freight forwarders is high. Integrated Service Providers (ISPs) dominate the market due to their ability to control huge parts of the air freight supply chain. To maximize profit and gain greater market share, airlines need to engage the logistics service providers (LSPs), who help to complete the ground pickup, storage and delivery of freight from/to customers. LSP services are demand-enhancing as they increase demand for the air freight service offered by the airline-LSP consortium. We consider how airlines can optimally structure their flight routes and frequency between hubs and prices to increase profits by working with the LSPs.

Approach: We first use mixed integer programming to generate the hub locations, routes and their frequencies for an airline, based on node-to-node demand, to maximize profit while reducing cost, by utilizing the demand-distance product and extractable demand for an airline at a node, relative to an ISP. Next, using a 3-player Stackelberg game, we find the best response for the airline, LSP and ISP, in terms of the offered service level and price, based on each player's ability to generate demand, the intermodal integration costs, and competition between the airline and ISP. We set the airline as a follower to the LSP and ISP.

Findings: We show the importance of airport demand enhancing services on profitability. We find the optimal price, service level, frequency, routes, hub location and profit under equilibrium. We show how airlines can compete with ISPs, and how LSPs can hold their profit and chain position.

Value: Privatization and deregulation in the air freight industry have invited competition. Airlines need to collaborate with the LSPs to improve their performance, or else airlines must reduce the dependence on the LSPs by starting in-house units to compete with the ISPs. LSPs realize that their services are increasingly commoditized and they need to improve service and reduce price to remain profitable and be an economic partner for the airlines. This paper concentrates on factors, especially demand enhancing services, to determine service level

and price. Studies on LSP-airline collaboration to generate freight demand are scant and this paper contributes in that respect.

Research implications: We provide insights into the design of route frequency and service offered by airlines based on the airline's and LSP's value-of-service. A 3-player cooperative game theoretic model involving collaboration between LSPs and airlines to the ISPs adds to the literature.

Practical implications: Airlines can apply the results to effectively utilize LSPs' services to enhance the demand for their own services.

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Keywords: Supply Chain Management, Demand-enhancing service, Air Freight Management, Game theory

Paper Type: Research Paper

Section 6: Sustainability and green logistics

INSTITUTIONAL PRESSURE, ORGANIZATIONAL VALUES AND CORPORATE ENVIRONMENTAL STRATEGY

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Abstract

Purpose of this paper:

Environmental management has been researching extensively in the last two decades. Scholars increasingly tout institutional theory as an important perspective for studies on environmental management. However institutional theory is not enough to understand the different reaction while companies facing similar institutional pressure in the industry. Toward environmental management, companies can take different strategies based on the managerial perceptions of environmental risks and market opportunities. Researchers have classified corporate environmental strategy along a continuum that ranges from reactive environmental strategy to proactive environmental strategy (Aragón-Correa and Sharma, 2003; González-Benito and González-Benito, 2005). At one end of the continuum, companies with reactive environmental strategy are typical of companies that only implement the minimal compulsory changes to meet regulations and take defensive posture to control the environmental protection investment. At other end of the continuum, companies with proactive environmental strategy are typical of companies that voluntarily take measures to reduce their impact on the natural environment and recognize the possible competitive advantage associated with investing in environmental management. Thus, it is necessary for scholars to investigate the potential moderators in the process of a firm's experiencing, interpreting, and managing institutional pressures (Heugens and Lander, 2009).

Exploring the moderating effect of organizational value (culture) may help provide more implications. A firm exerts discretion by following its own rules and values rather than passively submitting to conventions prevailing in its organizational field (Greening and Gray, 1994). The organizational field refers to "those organizations that, in the aggregate, constitute a recognized area of institutional life: key suppliers, resource and product consumers, regulatory agencies, and other organizations that produce similar services or products" (DiMaggio and Powell, 1983, p. 148). Thus, institutional pressures and organizational value may work together and interact with each other to affect innovation adoption. For instance, firms may react differently to the same levels of perceived institutional pressures to adopt GSCM due to the differences in their organizational values. However, to date, no research has empirically investigated the effects of institutional factors on environmental management strategy and the interaction effect of institutional pressures and organizational value. Such a void leaves a significant gap between theoretical and empirical research.

Design/methodology/approach:

We collect survey data from the manufacturing companies in China, and use structural equation modelling and hierarchical regression analysis for data analysis.

Findings:

The results of a survey of 250 firms suggest that the institutional pressures have effects on proactive environmental strategy. In addition, organizational culture (i.e., flexibility orientation and control orientation) plays different roles in the relationships between the dimensions of institutional pressures and corporate environmental strategy.

Value:

This paper therefore enrich environment sustainability research by examining the external pressure factors' effects on firms' environmental strategy, Also it lends support to the interaction effects of pressure and organizational culture on firms' proactive environmental strategy. The study also offers practitioners and policy-makers guidelines for promoting proactive environmental strategy.

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REVERSE SUPPLY CHAIN RELATION TO CIRCULAR ECONOMY

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Abstract

Purpose

Most of the research on logistics and supply chains has focused on forward logistics, but the reverse supply chain (RSC) has already been studied for more than a decade [3]. Meanwhile, the circular economy (CE) has gathered a lot of attention in recent years from management sciences as well as companies offering a practical alternative to the current linear economic model [1]. The purpose of this paper is to analyze the connections between these two concepts of RSC and CE, especially in terms of value creation.

Design/methodology/approach

The findings in this paper are based on the review of available literature and experiences from different industries. The phenomenon of the CE is still quite a rare topic for logistic and supply chain academics, despite there being a lot of literature available on logistics supporting environment friendly industries. This paper uses the value creation identification and analysis method to understanding the value determinants in RSC and CE businesses [2].

Findings

Disruptive business models are needed in order to move towards the CE model, and on the other hand, there is an evident need to base new business models on an in-depth understanding of stakeholders and the value creation [1, 2]. It is not enough just to focus on logistics and supply chain activities, but the entire business should be redefined towards the CE. We argue that entire product offerings should be redesigned and maintained through the end of the product's life, or the recycling or re-use of its materials. The reverse supply chain is then the economic activity to realize product return in practice.

Value

Our contribution narrows the gap between logistics and business research, in the field of environmental friendly and sustainable business operations and supply chain management by increasing the understanding of the relation between RSC and CE concepts.

Research limitations/implications

This study compares the RSC and CE concepts, without practical evidence from case studies, which is one of this study's limitations. In future research, more practical evidence is needed on the development of a CE business model with an efficient reverse supply chain. This paper defines hypotheses and research topics for the future.

Practical implications

This paper provides for practitioners better understanding of the development and movement towards a CE. It also analyzes how to transform a business's mindset from a traditional economic model towards circular logistics systems.

Keywords

Reverse Supply Chain; Circular Economy, Value creation

Category of the paper

Conceptual paper

References:

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MODELING CARBON FOOTPRINT OF THE REVERSE LOGISTICS OF DISPOSING WASTE OF UPHOLSTERY INDUSTRY

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Abstract

Purpose of the paper:

Owing to the rising awareness of the need to protect the environment, reverse logistics is being promoted to improve ecological sustainability of production. Reverse logistics can lower the costs of waste disposal, enhance market competitiveness, and maintain a good corporate image. Therefore, modern companies are focusing on environmental protection to demonstrate social responsibility. According to the World Organization for Economic Cooperation and Development (OECD) report of 2003, buildings consume 32% of resources, 12% of water and 40% of energy worldwide, and the building waste comprises almost 40% of the all waste in the world. Therefore, controlling waste from the upholstery sector may help slow global warming. An upholstery company generates a lot of waste at the start of a new interior decoration because it needs to destroy the existing decoration. However, the reverse logistics of the upholstery sector are still unclear.

Design/methodology/approach:

This study models the carbon footprints of disposing upholstery waste based on studies from Benjaafar et al. (2013), Pishvaei et al. (2009) and Tascione et al. (2014).

Findings:

This study models the carbon footprints of disposing upholstery waste, and expects to perform a preliminary qualitative analysis from the interviews to upholstery companies, and gathers factors of that contribute to carbon footprints before and after the adoption of reverse logistics.

Value:

This study models the current and new reverse logistics of disposing upholstery waste in Taiwan. Modeling the carbon footprint of disposing upholstery waste can help companies aware of the environmental impact of disposing of waste, and how to improve it through reverse logistics.

Key words: Upholstery, interior decoration, waste management, reverse logistics, carbon footprint, linear programming.

Category of the paper:

Research paper.

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GREEN INTELLECTUAL CAPITAL, GREEN DYNAMIC CAPABILITY AND PERFORMANCE : EVIDENCE FROM MANUFACTURING FIRMS IN TAIWAN

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ABSTRACT

Purpose of this paper:

This study, based on a survey of 1,231 main manufacturing firms in Taiwan, uses structural equation modelling to examine the relationships among green intellectual capital, green dynamic capability, and financial performance.

Design/methodology/approach:

The design of our postal questionnaire (green intellectual capital and green dynamic capability) was firstly based on a comprehensive literature review and then pilot tested by interviewing both academic and practical experts. We employed objective measures of financial performance, including return on assets (ROA), return on investment (ROI), profit margin, and earnings per share (EPS).

Findings:

One of the research results may demonstrates that top managers must enforce and improve the green intellectual capital and green dynamic capability to acquire and maintain financial performance,.

Value:

Based on the natural resource-based view (NRBV), the green intellectual capital and green dynamic capability were considered to be the deployment of a collection of green resources that enables it to successfully compete against rivals.

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A MEASUREMENT MODEL FOR EVALUATING CORPORATE SUSTAINABILITY PRACTICE IMPLEMENTATION

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Abstract

Purpose of this paper:

The research point outs that sustainability significantly influences the nature of firms' strategies and operations. An ever-greater number of companies are recognizing that sustainability has become part of their business strategies and the basis for corporate social responsibility (CSR) in response to strict legal and stakeholder requirements. However, studies regarding integrating sustainability into business strategies have fragmented into various areas of research like environmental management, cleaner production, environmental product, and/or green supply chains. Furthermore, a comprehensive measurement model for examining the level of corporate sustainability practice implementation has been sparse. As such, this study aims to identify and validate a measurement model for evaluating corporate sustainability practice implementation.

Design/methodology/approach:

This study first aims to identify constructs of corporate sustainability practice drawing upon literature review on the fields of environment management, cleaner production, environmental/green product, and green/sustainable supply chains. Second, based on survey and statistics techniques, we use manufacturing firms in Taiwan as the sample base to empirically validate the constructs and the measurement items of a firm's corporate sustainability practice.

Findings:

Drawing upon intensive literature review, we first identify five constructs: environmental management systems (EMS), environmental institutional management (EIM), environmental supply chain collaboration (ESCC), environmental operations management (EOM), and environmental product (EP). Moreover, a total of 233 survey respondents as a sample size are used for further examining the measurement items of each construct proposed by this study. The test results support the first-order model for the corporate sustainability practice implementation constructs. It is also found that corporate sustainability practice implementation can be conceptualized as a second-order multidimensional construct consisting of EMS, EIM, ESCC, EOM, and EP. In sum, the findings show that both the first-order and second-order models of corporate sustainability practice are reliable and valid.

Value:

This study is the first research which reviews various fields of literature associated with sustainability and identifies a comprehensive measurement model empirically rather descriptively, providing identified constructs and measurement scales for examining the level of corporate sustainability practice implementation.

Research limitations/implications (if applicable):

The proposed measurement model guides future empirical research related to companies' sustainability assessments and decisions not just in an unbalanced viewpoint but from a holistic perspective. This therefore helps researchers gain new and further insights for understanding the effects of firms' real environmental commitments and effort on their performance.

Practical implications (if applicable):

The expected results may offer guidelines for companies to re-examine or re-think the complex and multiple links between their sustainability impacts, their business strategies and operations, and their green resource investment and allocation, which thereby assists top executives with their business management transformations and more realistic and successful sustainability practice development.

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SOCIAL RESPONSIBLE GOVERNANCE MECHANISMS AND FIRM PERFORMANCE - EVIDENCE FROM APPAREL SUPPLY CHAINS

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ABSTRACT

Aim/Purpose: This study develops a model of social responsible governance mechanisms and investigates the relationships between governance mechanisms and firm performance in the context of apparel supply chains.

Design/Methodology/Approach: A survey methodology is adopted and a total of 267 responses are collected from Bangladesh garment manufacturers. A covariance based partial least square structural equation-modelling (PLS-SEM) method is employed to confirm the measurement items of the model and to test the hypothesised relationship between governance mechanisms and firm performance.

Findings: The results of factor analysis confirm that the social, environmental and economic criteria reflect supplier selection construct, and supplier assessment and collaboration forms the supplier development construct. The results of the structural model evaluation indicate that there is a significant positive relationship between supplier selection construct with environmental and social performance, whereas, supplier development construct has a positive effect on all three performances- environmental, social and economic performance.

Originality/Value: To our knowledge, This study is the first empirical research to examine the impact of both supplier selection and supplier development mechanisms on firm performance.

Research Limitations/ Implications: This study is conducted in the context of Bangladesh apparel industry, so the results may not be generalised to other industries. Therefore, future research can validate the model with other industry sector samples or other country samples.

Practical Implications: The findings of this study will assist apparel manufacturers in implementing social responsibility, and retailers to understand the social responsible needs of manufacturers. It also provides guidelines for organisations like Bangladesh garment Manufacturers association (BGMEA) to develop standards for auditing Bangladesh garment manufacturing facilities.

Keywords: Social responsibility, social responsible supply chains, governance mechanisms, garment industry.

Paper Category: Research paper

WASTE NOT, WANT NOT: MANAGING PERISHABLES IN SMALL AND MEDIUM RETAIL ENTERPRISES

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Abstract

Purpose of this paper:

Recent literature indicates that around one third of perishable products finish as waste (Mena et al., 2014): 60% of this waste can be classified as avoidable (EC, 2010) suggesting logistics and operational inefficiencies along the supply chain. In developed countries perishable products are predominantly wasted in wholesale and retail (Gustavsson et al., 2011) due to customer demand uncertainty the errors and delays in the supply chain (Fernie and Sparks, 2014). While research on logistics of large retail supply chains is well documented, research on retail small and medium enterprises' (SMEs) capabilities to prevent and manage waste of perishable products is in its infancy (c.f. Ellegaard, 2008) and needs further exploration. In our study, we investigate the retail logistics practice of small food retailers, the factors that contribute to perishable products waste and the barriers and opportunities of SMEs in retail logistics to preserve product quality and participate in reverse logistics flows.

Design/methodology/approach:

As research on waste of perishable products for SMEs is scattered, we focus on identifying key variables that contribute to the creation of avoidable waste. Secondly we identify patterns of waste creation at the retail level and its possibilities for value added recovery. We use explorative case studies (Eisenhardt, 1989) and compare four SMEs and one large retailer that operate in a developed market. To get insights into specificities of SMEs that affect retail logistics practice, we select two types of food retailers: specialised (e.g. greengrocers and bakers) and general (e.g. convenience store that sells perishable products as a part of the assortment)

Findings:

Our preliminary findings indicate that there is a difference between large retailers and SME retailers in factors that contribute to the waste creation, as well as opportunities for value added recovery of products. While more factors appear to affect waste creation and management at large retailers, a small number of specific factors appears to affect SMEs. Similarly, large retailers utilise a range of practices to reduce risks of product perishability and short shelf life, manage demand, and manage reverse logistics practices. Retail SMEs on the other hand have limited options to address waste creation and value added recovery. However, our findings show that specialist SMEs could successfully minimize waste and even create possibilities for value added recovery of perishable products. Data indicates that business orientation of the SME, the buyer-supplier relationship, and an extent of adoption of lean principles in retail coupled with SME resources, product specific regulations and support from local authorities for waste management or partnerships with other organizations determine extent of successful preservation of a product quality and value added recovery.

Value:

Our contribution to the SCM academic literature is threefold: first, we identify major factors that contribute to the generation waste of perishable products in retail environment; second, we identify possibilities for value added recovery for perishable products and third, we present opportunities and challenges for SME retailers to manage or participate in activities of value added recovery. Our findings contribute to theory by filling a gap in the literature that considers product quality preservation and value added recovery in the context of retail logistics and SMEs.

Research limitations/implications (if applicable):

Our findings are limited to insights from five case studies of retail companies that operate within a developed market. To improve on generalisability, we intend to increase the number of cases and include data obtained from the suppliers and organizations involved in reverse logistics flows (e.g. local authorities, charities, etc.).

Practical implications (if applicable):

With this paper, we contribute to the improvement of retail logistics and operations in SMEs which constitute over 99% of business activities in UK (Rhodes, 2015). Our findings will help retail managers and owners to better understand the possibilities for value added recovery, investigate a range of logistics and retail strategies suitable for the specificities of SME environment and, ultimately, improve their profitability and sustainability.

Key words: product quality preservation, value added recovery, retail logistics

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AN EXPLORATORY STUDY ON THE ENVIRONMENTAL IMPACT OF LOGISTICS CLUSTERS

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Abstract

Purpose - The development of logistics clusters (LC) is a step towards economic growth as it leads to a well-established physical infrastructure, the enhanced availability of logistics-related facilities, and value-added services (Sheffi, 2012). Research into LC has been mainly on their development and impact on economic growth, with little attention being paid to the social and environmental impacts. Although the impact of logistics operations on the environment has been discussed widely in the literature, research on the environmental implications of LC has not received attention. Drawing on Relational View (Dyer and Singh, 1998), this paper investigates the possible environmental implications for companies operating within a logistics cluster. It also explores the interactions between those companies and whether or not firms located within the cluster can positively or negatively affect the overall environmental performance.

Design/ methodology/approach – Based on the Relational View (RV) Theory, this research proposes a conceptual framework, which explores the link between LC and environmental performance. RV has been considered in this research as a suitable lens because of its relevance, and simplicity of application due to its unique enablers that allow firms to achieve mutual benefits that cannot be achieved individually. This paper presents an exploratory research that has been carried out through semi-structured interviews with five companies located in two logistics clusters in Saudi Arabia.

Findings – It is found that companies tend to establish collaborative relationships, share knowledge and resources with partners (e.g. sharing transportation and warehousing facilities), but with a limited view on the environmental aspect. Results have also shown that companies are interested in sharing more resources in order to improve their capabilities and operational efficiencies.

Research limitations/implications – This exploratory study contributes to the body of knowledge on LC, specifically on the environmental aspect of the sustainability by developing a conceptual framework based on RV Theory. Our study attempts to fill the academic gaps concerning the empirical investigation of environmental performance in the LC context.

Practical/ Policy Impact - Our study provides valuable insights on how LC companies share tangible and intangible resources which can be adopted to reduce the environmental impact. The study also provides directions to academics and practitioners, particularly, the logistics companies that are located, or willing to locate within a logistics cluster.

Originality/value- While there is a growing interest in the environmental sustainability as an emerging factor that affects companies, there is a lack of empirical study investigating how being located in such cluster can help companies to reduce the environmental impact.

Category of the paper

Case study

Keywords: Logistics Clusters, Environmental Impact, Relational View Theory.

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

ANTECEDENTS TO SUSTAINABLE SUPPLY CHAIN INNOVATION (SSCI)

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Abstract

Purpose of this paper:

Sustainable supply chain innovation (SSCI) has gained increasing attention from both academia and corporation. However, the systematic research focusing on its antecedents is still rare.

Design/methodology/approach:

To investigate the antecedents to sustainable innovation within supply chain context, a conceptual framework is proposed based on literature review and social capital theory. In the framework, all critical antecedents to supply chain innovation capabilities are well-organized within three dimensions of social capital including structural, relational and cognitive capitals. Innovation capability is expected to deliver sustainable performance in supply chain, which is called as sustainable supply chain innovation (SSCI).

Findings:

In this study, a series of propositions are proposed. We argue that three dimensions of social capital in supply chain are all positively related to supply chain innovation capabilities and lead to an increasing and sustainable innovation performance. The relationships are also positively moderated by an advanced information technology application.

Value:

This study provides a complete view of the application of social capital theory onto supply chain innovation and creates a linkage between supply chain innovation and sustainability. A greater understanding on such innovation framework and their impacts enable firms to allocate related resources to establish or strengthen the innovation capabilities, followed by an expected sustainable performance as a result. Hopefully, this study and the proposed framework could be appreciated by practitioners in both academia and corporation for further improvement and research.

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THE IMPACT OF SUPPLY CHAIN SYSTEM AND LEARNING ON THE SUSTAINABLE PERFORMANCE: EMPIRICAL EVIDENCE FROM CHINA

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Abstract

Purpose of this paper:

The purpose of this paper is to identify and empirically test a framework analyzing the effect of supply chain system, which consists of function, structure, and context, on sustainable performance. The study further explore how could supply chain learning affect sustainable performance directly and play a mediate role between supply chain system and supply chain sustainable performance.

Design/methodology/approach:

The study develops a structural equation model to test the hypotheses. Data were collected based on a survey of 264 firms in eight industries located in China.

Findings:

The study indicates that supply chain system, that is, function, structure, and context could directly and indirectly enhance the three dimensions of the supply chain sustainable performance, in economic, social, and environment perspective. Furthermore, authors also find that supply chain learning as a catalyst for supply chain system could affect the sustainable performance of supply chain positively.

Value:

The study is among the first to view the effect of the function, structure, and context of a supply chain on supply chain sustainable performance with the system theory perspective. In addition, the paper explores the role of supply chain learning as a mediating variable between supply chain system and sustainable performance.

Research limitations/implications:

Firstly, the empirical data did not include the change of a supply chain system and supply chain learning over time. Therefore, future research might aim at a longitudinal study. Secondly, our results are based on answers of a single respondent of each organization. Future research might want to include multiple respondents per organization with an extension on objective measures instead of perceptual measures. Thirdly, as our samples are limited in Chinese firms, we suggest a future research explore other contexts as a comparison. Finally, future research might divide the participants of supply chain learning into suppliers and customers so as to exploit the impact respectively.

Practical implications:

The proposed model offers managers a path to rethink and redesign their activities to achieve a supply chain sustainability. To meet the worldwide quest for sustainability, organizations should pay more attention to issues relating to supply chain's function, structure, and context. In addition, more attentions should be paid by organizations to their external context situation and supply chain learning.

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EVALUATION OF SECURITY SYSTEMS WITH ELECTRONIC SEALS AND DGPS FOR CONTAINER TRANSSHIPMENT TERMINALS

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Abstract

Purpose of this paper:

To help the terminal operators with a practical and convenient tool for the evaluation of security systems for container transshipment processes, this study aims to develop a decision support model with multi-objectives of minimizing implementation costs, and maximizing time savings and security standards.

Design/methodology/approach:

The proposed model is based on the approaches of influence diagram and utility theories. For efficient probabilistic inferences, the proposed influence diagram is converted to a Bayesian network model.

Findings:

An evaluation model with efficient probabilistic inference mechanism is proposed for the evaluation of security systems at container transshipment terminals. In addition, a simulated case study based on the environment of the Port of Yokohama was investigated to illustrate the practicability of the proposed evaluation approach.

Value:

Although past studies have already discussed the results and benefits brought by the adoption of security solutions on the container operations, there is lack of research addressing how to select the appropriate security solutions for the container transshipment terminals, where there are many complex considerations and factors involved. The proposed approach in this study can facilitate the evaluation processes of security systems with e-seals, RFID vehicle control system, and DGPS for port administration.

Research limitations/implications (if applicable):

Future studies may include more uncertain variables to fully consider the decision environment of the container transshipment terminals. Other approximation methods can be explored to improve the inference approximation of influence diagram model.

Practical implications (if applicable):

Due to the advantages of influence diagram approach, terminal administration can easily modify our proposed approach to develop their evaluation model based on their decision environment and choose the most suitable technology solution for them. A simulated case study based on the environment of the Port of Yokohama suggests that the investment of active e-seal system generally proves to be the most suitable choice for the container transshipment processes with the trade-off consideration of time savings, security, and investment costs.

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INTERNATIONALISATION OF LOGISTICS FIRMS THROUGH ORGANISATIONAL KNOWLEDGE FLOWS

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Abstract

Purpose of this paper:

The purpose of this paper is to investigate how organisational knowledge flows can support and contribute towards the internationalisation of logistics firms. Global supply chain management entails the internationalisation of logistics companies to establish subsidiaries or international joint ventures in the global markets. The role of knowledge flows facilitates these internationalising logistics firms to be better embedded into a local market across borders. Specifically, this research examines four types of knowledge flows being integrated in the internationalisation process of global logistics firms to achieve internal integration.

Design/methodology/approach:

An exploratory approach employing qualitative multiple case studies are adopted for this research. Seven South Korean logistics firms operating in the UK were identified and studied. The contribution of South Korea and UK to international trade and logistics is similar, but their industry contexts and cultures are quite differed. These seven firms are the entire population of Korean logistics firms which have a subsidiary in the UK. The case firms encompass two liner shipping companies, three international freight forwarding, 3PL companies and two airlines. In total, 17 in-depth semi structured interviews were conducted in each firm with current UK subsidiary managers as well as top and middle managers deployed to the UK subsidiaries and local staff. Within-case and across cases data analysis were carried out and the analysis was facilitated through pattern matching and systematic case comparison.

Findings:

The findings reveal that the existence of diversity and complexity of logistics firms' headquarters and subsidiary relationship within international networks of organisational knowledge flows. Five types of organisational knowledge flows were identified in each seven logistics firm: knowledge flows from subsidiary to headquarters, knowledge flows from location to subsidiary, knowledge flows from subsidiary to location and knowledge flows from headquarters to subsidiary. In addition, externally sourced knowledge flows were identified to be important in the process of internationalisation.

Value:

Within the logistics domain, this research provides further theoretical insights and a framework into internationalising logistics firms by building on internationalisation process, knowledge management and network disciplines.

Practical implications (if applicable):

This research provides implications for the managers of both global logistics firms and their subsidiaries. The findings imply that global logistics firms need to have different ways of devising organisational knowledge flows effectively. More holistic perspectives for internationalisation strategy can be developed and the top and middle managers of global logistics firms can obtain useful lessons from this study.

Research limitations/implications (if applicable):

This research suggests key implications for our theoretical understanding of the internationalisation process by integrating the network of knowledge flows and how knowledge flows facilitate operation of logistics firms internationally. However, this research is not without limitations. First, given the findings of this study are based on seven logistics firms, it limits the generalizability of the results toward other industries and countries. Second, emanating from its exploratory qualitative nature, the findings could be tested more systematically through a quantitative approach.

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THE VALUE OF 'SAME DAY' LOGISTICS IN E-TAILING: A REVIEW OF CONSUMER PREFERENCES

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Abstract

Purpose of this paper:

UK e-tailers have been accelerating their delivery speeds, to the extent that 'same day' order fulfilment is becoming available as a standard, rather than bespoke, service to customers (see for example Telegraph online, 2016). Qualitative research conducted with e-tailers, LSPs and a technology service provider, has revealed that 'same day' represents a considerable challenge to the industry (Lasisi et al., 2015). The purpose of the research is to discover to what extent 'same day' is required by customers, and how much they would be prepared to pay for this service?

Design/methodology/approach:

A survey has been designed and piloted, using probability sampling (Bryman and Bell, 2003) and a sample size of n=1194, to discover consumer attitudes to 'same day' delivery. Sample demographics are evaluated by means of descriptive statistics. Survey data is analysed in relation to two hypotheses:

- H1. Delivery speed has become a major factor for customers repeated patronage/loyalty in recent times.
- H2. Customers will pay a premium for speedy delivery of parcels with attached importance.

In addition, statistical analysis is employed to explore relationships between demographic variables, preferences and pricing of 'same day' services.

Findings:

Extensive statistical analysis reveals 10 key findings. Some highlights are that whilst H1 is confirmed, customers are generally unwilling to pay a premium for 'same day'. H2 is confirmed, but with a 'low ceiling' for the premium. The research reveals early evening as the favoured delivery time, and some interesting differences in preferences between sub-groups.

Value:

The research will help UK e-tailers and LSPs to design their service offering, and competitive strategies.

Research limitations/implications (if applicable):

The findings concerning consumer preferences do not explain the acceleration in same day services being offered by UK e-tailers. It seems that this development is being driven by retail competition rather than by consumer preferences. However, the service can only be cost effectively offered by very large retailers with distributed inventory, working in partnership with large and vertically integrated LSPs.

Practical implications (if applicable):

The move towards 'same day' poses a considerable threat to smaller retailers and LSPs. A number of competitive strategies could be adopted to counter this threat, and these include: collaborative partnerships between e-tailers and LSPs, and LSPs and LSPs, and mediation by an Electronic Logistics Marketplace.

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Section 8: Value creation and customer service

THE IMPACT OF CUSTOMER VALUE TOWARDS CUSTOMER LOYALTY OF READY TO DRINK TEA BOTTLED

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Abstract

Purpose of this paper: Business development challenges is about how to encounters competitiveness through value creation concept. This research objective are to provide value proposition and development model of the influence factors for customer loyalty of instant tea drink product based on consumer value through customer satisfaction.

Design/methodology/approach: The study was conducted among young adult customers who lived in Jatinangor District as one of higher education centre area in Bandung City as potential buyer for three kind of ready-to-drink tea bottled brand in Indonesia; with descriptive and explanatory survey data of 90 respondents. Afterwards, the hypotheses were tested by elaborating value on customer proposition and developing conceptual statistical model utilizing path analysis technique to address customer value and satisfaction impact on customer loyalty.

Findings: Tested on validity and reliability showed satisfactory result. Research conclusions showed value proposition of ready-to-drink tea bottled that produce by local company has a higher competitiveness compare to its competitors. Maintaining customer value can improve customer loyalty, whilst require customer satisfaction as one of supply chain performance indicator. Other marketing program and attributes need to integrate in order to gain customer loyalty and be more competitive in the marketplace.

Value: This paper represents a few studies on customer value that conducted especially on beverages product, and show the challenges in buyer behavior of convenience products in a competitive market based on descriptive findings and empirical study.

Research limitations/Implications: Although an extensive literature review was made, this paper is based only on one single case study on one particular area.

Practical Implications: By applying customer value mapping, manager could present their product company position in the marketplace, and create customer loyalty program as part of customer relationship improvement to give more attention to fulfill customer unique needs. It would also give broader information of how extensive the company value creation to encounter market competition.

Keywords: *value creation, customer service, relationship marketing, consumer behavior*

Category of the paper: Research paper

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DESIGNING A FRAMEWORK AND RESEARCH MODEL FOR THE LOGISTICS SERVICE PROVIDERS INNOVATION AND ADOPTION

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Abstract

Purpose of this paper

This research work is aimed to examine the technological and non-technological innovation adoption mechanism of Logistics Service Providers (LSPs) in the United Arab Emirates (UAE) as the UAE is considered to be one of the fastest emerging markets in the world. By investigating the critical drivers that stimulates LSPs for innovation, growth and sustainability, the research develops various theoretical hypotheses and design a framework that could be used practitioners in the innovation adoption landscape.

Design/methodology/approach

The proposed methodology follows with the various hypotheses setting, questionnaire design, focus interview, surveying and testing the variables. The research develops an initial framework as well as measures of various factors that drive for technological innovation and adoption in the UAE perspective.

Findings

The survey results have indicated mixed outcome stating that the lead logistics service providers (15% respondents) have latest technological adoption however majority of them (47% respondents) are still in their nascent stage of technological adoption because of the associated challenges. The research findings can thus be used to promote innovation in the logistics industry by raising the potential to strengthen the competitive advantage of regional logistics industries and also to strengthen the positioning of Dubai as the logistics hub in the Middle East region.

Research limitations/implications (if applicable)

The research is therefore limited to the UAE region. Further, an in-depth understanding of regional logistics innovation mechanism would help to identify the most inductive environment for supply chain innovation in the logistics industry, as well as helps to determine the most promising drivers in current logistics services.

Practical implications (if applicable)

Theoretically, LSPs innovation relates to multiple stakeholders in the logistics and their interactions are influenced by various factors. It requires researchers to study the innovation process from multiple angles with various theories in the field of logistics. It needs a strong professional research team with good understanding of these theories, as well as strong integration ability. The in-depth case study, detailed survey data analysis, and model development and simulation all require a good understanding of the grounded theories and research expertise in the proposed area.

Paper Type: Research paper

Keywords: *Logistics Service Providers Innovation, Innovation adoption; the United Arab Emirates*

EXPLORING VALUE CREATION AND APPROPRIATION IN THE REVERSE CLOTHING SUPPLY CHAIN

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Abstract

Purpose of this paper:

The purpose of this paper is to explore the two processes of value creation and appropriation among companies in a retail reverse logistics system. The value concept has in recent years got increased attention in research on reverse logistics (Jayaraman and Luo, 2007). However, there is still a lack of more detailed understanding of the values created. There is also a need to not only consider the value creation, but also how the value is appropriated among supply chain members. Whereas the value creation process is concerned with the total amount of value created among supply chain members, the value appropriation process decides the involved companies' ability to extract money from the value created (Wagner et al., 2010).

Design/methodology/approach:

Grounded in the two fundamental processes of creating and appropriating value (Mizik and Jacobsen, 2003), this paper applies the value concept on retail reverse logistics practices. The paper is based on a case study of the take-back scheme for used clothes in the textile fashion industry. The case study includes collectors (clothing retailers) as well as specialised sorting companies responsible for sorting and further distribution of the used clothes.

Findings:

The retail reverse logistics system in the case study consists of multiple stakeholders in a complex network. Different types of values created are identified, and strategies for value appropriation among the different companies are discussed. A strong power position based on knowledge and/or financial strengths is here identified as a major factor in the value appropriation process.

Value:

The value concept has so far been discussed at a superficial level in research on retail reverse logistics. This research demonstrates that the value concept, including value creation as well as appropriation, helps to understand the rationale behind a certain supply chain structure in terms of participating supply chain members, types of activities conducted, and division of responsibility.

Practical implications (if applicable):

As a company's resources are limited, companies need to manage the trade-off between the value creation and appropriation processes, and strategically find a suitable mix between them.

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CREATING VALUE THROUGH REVERSE LOGISTICS IN A MULTI-ECHELON USED CLOTHING CHAIN

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Abstract

Purpose of this paper:

Reverse logistics (RL) in retail value chains is an increasingly emerging phenomenon yet under-explored in research (Bernon et al., 2011). The literature becomes shallower while discussing the “process” of value creation in such context. Given the inherent complexity and differentiated value creation in many RL networks (Schenkel et al., 2015), e.g. in used clothing, such values are constituted by different actors by prioritizing and committing their strategic resources for developing distinct rent-earning competencies.

In this context, the purpose of this paper is to explore how differential value is created by firms embedded in a multi-echelon reverse value chain for used clothing, by successfully exploiting multi-level (intra- and inter- firm) resources, via various underlying rent-earning mechanisms.

Design/methodology/approach:

An explorative case study approach is adopted in reverse clothing value chain context to investigate the take-back scheme that includes multiple actor types and also spans globally. An abductive research process is adopted along two stages; Stage 1 (proposes a new theoretical framework on “how” value is created in reverse value chains based on resource-based (RB) and relational rent-earning views to exploit various RL attributes or capabilities) and Stage 2 (seeks real-life case observations to explore the empirical reality), and finally systematically combining these knowledge.

Data is collected through semi-structured interviews, observation and documented notes and reports, conducted with various actors, viz. retailers, social enterprises (charities and non-profit retailers), commercial brokers/sorters, and specialized sorting firms from India.

Findings:

Differentiated values are created by the actors involved with multi-echelon take-back network. The RB and relational theories underpin the rent-earning mechanisms further highlighting several key ways to sustain this value.

The VRIO model in the RB theory (Barney and Clark, 2007) shows how value is created *within* firm boundaries. The relational view highlights four rent-earning mechanisms: relational asset specificity and information sharing for the success of cost-neutral take-back agreement, along

with resource and capability complementarities and trust in the relationship. Together they provide understanding of the entire “process” of rent generation.

Value:

This research contribute to exploring the “process” of rent-earning generated by critical intra- and inter- organizational enablers of value creation in complex RL networks.

Practical implications:

The paper improves the understanding of the key mechanism for value creation for actors working within the used clothing chain.

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Key words:

Value creation, Reverse Logistics, Reverse value chain, Resource-Based View, Relational View, Used Clothing.

A STUDY OF THE SERVICE QUALITY OF SCIENTIFICALLY PROCESSED CHINESE HERBAL MEDICATION (SPCHM) LOGISTICS: A CASE OF THE LARGEST TAIWANESE LOGISTICS SERVICE PROVIDER FOR SPCHM

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ABSTRACT

Purpose of this paper

This paper aims to investigate the customer demand of Scientifically Processed Chinese Herbal Medicine (SPCHM) logistics and to prioritize strategies to improve service quality.

Design/methodology/approach

A Structural Equation Modelling (SEM) model is used to examine the impact of service quality on customer satisfaction and loyalty for SPCHM logistics service providers. Afterwards, we use the quality function deployment (QFD) to determine the priority of quality improvement strategies according to customer demands.

Findings

The results indicate that service quality has significant impact on customer loyalty. In light of logistics service of SPCHM, customers are concerned about the capabilities of service providers to control the temperature, humidity and prevent access by pests. Moreover, we also discover that the switching barriers in this industry are higher than in other industries.

Research limitations/implications (if applicable)

This study only selects the largest Chinese herbal medicine logistics company as a representative investigation. For future studies, more logistics service providers as respondents are more comprehensive and complete to represent a country or an area.

Practical implications (if applicable)

"maintain existing customers", "shorten the process for dealing with anomalies", "inspecting operating process regularly", "Set up packaging examination mechanism" and "Provide competitive rates to customers" are of high priority to improving the service quality.

What is original/value of paper

QFD has been commonly applied to analyze service quality (e.g. Wang, 2007; Liang et al., 2012), however, we make use of SEM model to verify the relationship between the service quality and customer loyalty first, then conducting QFD analysis. It's unprecedented in the studies of logistics service in Chinese herbal medicine.

VALUE CO-CREATION IN MAINTENANCE AND MODIFICATION OPERATIONS: AN EXCHANGE ECONOMY PERSPECTIVE OF ENGINEERING SERVICE PROVISION

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Abstract

Purpose of this paper: Maintenance and modification operations are a form of engineering associated with sustaining production. This represents a commonly outsourced service that is purchased by a goods producing customer. Value co-creation represents a mode of interaction between firms embedded in a collaborative relationship involving iterative and dialectical learning to create customer value; especially called for in cases of reciprocal interdependencies with heightened environmental uncertainty. The purpose of this paper is to probe into what characterizes efficient and effective value co-creation in maintenance- and modification operations.

Design/methodology/approach: A longitudinal continuous single case study of context-embedded administrative process. The business relationship between an engineering service provider and its petroleum producing customer operating a land facility for natural gas production from sub-sea installations is studied including contextual perceptions. Qualitative data provides empirical grounds for theory development and empirical foundation for conceptual modelling of interaction in the dyadic relationship and its context as layers; systemic "supply chain" and wider non-systemic "supply network". The dyad is viewed as the realm for problem-solving while this dyad is entangled in different supplier, customer, competitor and other types of relationships. Analysis points out how actors need to frame their immediate dyadic relationship-interaction involving potential for value co-creation, in spite of concerns associated with the network of other firms it also does business with. The dyad then gets for a time cognitive priority while the context gets toned down. Supply chain management integration is modelled as layers of complementary dyadic, chain and networked interaction. What constitutes value-co-creation as exchange is enhanced by service-dominant logic thinking encompassing analytically exchange as customer value-driven economic behaviour to improve MMO service production.

Findings: Value co-creation is modelled conceptually, including effectiveness and efficiency indicators, in heightened reciprocal interdependency. Dyadic relationships are modelled as layered in the supply chain as well as the overall supply network; a view of how supply chain management may be carried out in this case, engineering service provision.

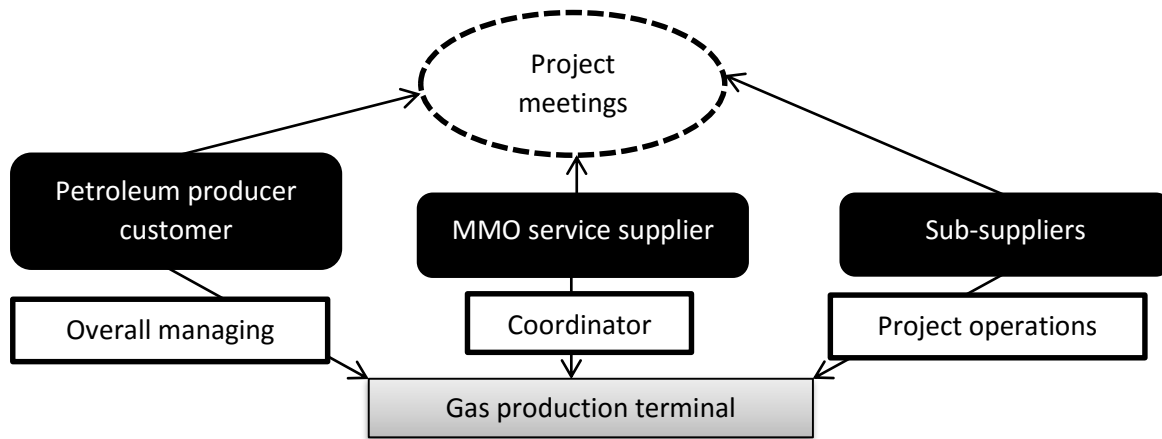
Value: The conceptual model developed through this study lays ground for when and how to develop administrative business processes in the services industry providing also direction for further research.

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CUSTOMER VALUE MANAGEMENT FRAMEWORK FOR SUPPLY CHAINS

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Abstract

Purpose of this paper

Customer value has been a relevant topic in marketing research for a long time but it has only recently got attention in logistics and supply chain management (Lin & Ou 2011). Research on customer value has been focused on how to recognise value and how to classify value determinants in general, and a more precise viewpoint into supply chain interfaces is needed. In this paper we present a model that helps companies and researchers to identify and manage customer value as a part of supply chain management.

Design/methodology/approach

The paper consists of a literature review of customer perceived value and supply chain management and a multiple case study of six companies. Three rounds of theme interviews were conducted in the companies, and in addition some stakeholders were interviewed. Customer value was examined as both tangible and intangible value both in B2C- and B2B-markets.

Findings

It was discovered that the systematic identification and management of customer value is uncommon, and its emphasis is on personal relations with customers. Supplier's product promise, customer's freedom of choice and appropriate e-services were identified as key factors of customer value in deliveries. It was also observed that the employees of the supplier companies can more effectively comprehend customer value if the concept is supported by a structured model, although usage of such a model may limit or direct attention to certain aspects.

Value

Customer value has been previously looked into and seen mostly from the company's direct customer's perspective only (Lindgreen et al. 2012). The results provide a new way to detect customer value and its influence through supply chain. The created framework divides the determinants into three classes – point-form, through-going and transferring customer value and these classes provide a basis to manage different customer value determinants variously without fastening on other value classifications (e.g. Rintamäki et al. 2007).

Research limitations/implications

Customer value determinants in service business were not separately investigated and more research on the framework's applicability on pure service delivery will be needed.

Practical implications

As a result, a framework was developed that can be used by companies to identify factors affecting value in different parts of supply chain. This model enables companies to find value determinants that affect not only its own business interfaces but also their far-reaching consequences. The framework can also be used to analyse the effects of the value factors

from the end user's perspective throughout the supply chain. That enables companies to better proportion and target their actions on customer value determinants depending on their effects for final customer's experience. The research and framework creation process helped companies to understand that customers don't see all value determinants equal and therefore also different management processes for different types of determinants are needed.

Category of the paper

Research paper

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Section 9: Smart Logistics

ESTIMATING LAST-MILE DELIVERY IMPEDANCE: A CITY LOGISTICS CHALLENGE

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ABSTRACT

Purpose: This paper estimates the potential transportation network impedance to last mile delivery using spatial measures of planning controls. The transport network last mile impedance is defined as the amount of resistance imposed to traverse through a route in a network from the point pick-up to the point of delivery.

Methodology/Design: Impedance to last mile delivery is computed as the potential hindrance or obstruction to last mile delivery as imposed by transportation and planning constraints to movement of goods on a network and not in terms of time or monetary value. A matrix of key urban and transport planning measures is first generated and then aggregated to compute and visualise the last-mile delivery impedance. GIS tools are used to produce overlays to represent transport and planning control measures such as road congestion, parking restriction, loading/unloading bay, speed limit, land use, school zone, dedicated bike/bus path, and proximity to activity centres. Data variables are standardised and converted into same unit (0 -100). An overlay function is used to generate a new layer of last mile delivery impedance. Multi-criteria tools are applied to generate the potential last-mile delivery impedance for Maribyrnong City Council in the city of Melbourne.

Research Findings: The key findings from the study reveal the spatial variation of last mile delivery impedance in different part of the study area and how last mile delivery is impeded by compactness within the Activity Centres, retail zones, pedestrianized streets, the transport infrastructure related constraints. Based on the mapped outputs, a new logistics zoning system is developed to demarcate areas of high impedance to freight flows to help improve the efficiency of last mile delivery to retail businesses within the council.

Research Limitations: The use of static measures of urban planning restricts the robustness to estimate dynamic and real-time last-mile delivery of freight for business to business transactions. The spatial approach is valuable for broader urban planning at a metropolitan or council level but its use is somewhat limited to assist in daily operational and logistics planning.

Practical Implications: The planning and Transport Systems contributes to the severity of last mile delivery problem in urban areas through different land use control measures resulting

from city compactness (Alho et al., 2015). The mapped outputs will help urban planners and logisticians in mitigating potential delay in delivery of goods. Localised strategies can then be deployed to improve the delivery lead time to retail businesses particularly in Central Business District experiencing development intensification.

Originality/value of the paper: The relationship between urban planning measures and last mile delivery has neither being theoretically evaluated nor empirically tested. Micro-scale mapping at the street level adds an innovative urban planning dimension to research in last-mile delivery problem.

Keywords: Last miles, city logistics, retail logistics, planning controls and land use.

EXPLORING THE DEVELOPMENT OF AN INTERNET OF THINGS (IOT) ENVIRONMENT FOR VALUE GENERATION IN THIRD-PARTY LOGISTICS OPERATIONS

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Abstract

Purpose of this paper:

Advances in sensor technology and ubiquitous broadband communication have set the foundation for Internet of Things (IoT). In the IoT paradigm, many of the things that surround us will be on the network in one form or another (Gubbi et al., 2013). Xu et al. (2014) state that the integration of sensors/actuators, RFID tags, and communication technologies serves as the foundation of IoT and explains how a variety of physical objects and devices around us can be associated to the Internet and allow these objects and devices to cooperate and communicate with one another to reach common goals.

In IoT, unstructured data generated by users' mobile devices and sensors can be used to generate value through new business models and efficient operations. For example in IoT, smart meter data exchange for residential, office, industrial and electric and plug-in hybrid vehicles can be used for better data analytics for the smart grid and management of supply chains. The aim of this work is to investigate the feasibility of developing a value generating environment by using wireless sensors to support IoT and related initiatives such as the smart grid and electrification of vehicles involving a third-party logistics provider (3PL).

Design/methodology/approach:

This paper has considered the use of an industry case comprising a 3PL which provides catering services to the airline industry. The 3PL assembles food and drink trolleys which are sent to a nearby airport using trucks. In this scenario there is the potential for increasing the numbers of sensors, smart meters and use of electric plug-in vehicles. Wireless Sensor Network (WSN) theory can simulate the use of smart meters and sensors. These can transmit meter readings to a cloud-based big data platform as the information exchanged is non-structured. The low-energy adaptive clustering hierarchy (LEACH) algorithm is suitable to test the use of WSN for the common network platform requirements of IoT. A Matlab implementation of the LEACH algorithm was used in this work. The model considered an area of 2500 m X 2500 m, which represents the area between the preparation warehouse and the airport terminal.

Findings:

WSN offers several advantages such as low network clustering which allows bandwidth reuse, better resource allocation and better energy management/power control. According to the values obtained for 135 iterations, the number of packets sent by 8 nodes to the base station reached 6, for 16 nodes the number of packets sent reached 18 for 40 nodes the number of

packets sent to the base station reached 25. For 20 nodes the number of packets sent to the cluster head is equal to 6. For 16 nodes the number of packets sent is equal to 16 and for 40 nodes the number of packets reaches 52. For 8 nodes the initial energy supplied is equal to 10 J, for 16 nodes is 30 J and for 40 the amount is 50 J. In the scenario presented here, the number of packets sent can be related to data traffic associated to metered readings required in the delivery of goods to an airport terminal. The adequate management of energy in the network means nodes will have enough energy left to complete the iterations associated to the task of going to the airport to deliver the trolleys.

Value:

The scenario presented in this paper involving a 3PL preparing food and drink trolleys delivered to an airport terminal show the scale of the potential impact of WSNs in logistics and transportation in general. Within the paradigm of IoT, we can see WSNs being adopted for other applications including sensor deployment in urban downtown areas or in the highway network. These scenarios may benefit extensively from the existence of a convergence platform capable of serving the needs of various types of users. Finally, research in IoT involving logistics and supply chain has great potential but at the same time IoT poses new challenges for privacy and security which they need to be addressed.

Research limitations/implications (if applicable):

IoT represents a major paradigm which is influencing several sectors and transport/logistics is one of them. WSNs represents one technology among a myriad of different technologies that can be used in IoT. What is important to highlight is that WSNs need to be integrated to other technologies to support IoT ubiquitous access to information. WSNs can be part of convergence network platforms, grouping different technologies for IoT. This work demonstrated that WSNs can be considered as an essential components of the sensor layer comprising the IoT paradigm and support the network and application layers.

Practical implications (if applicable):

IoT is closely related to other major initiatives such as smart grid and intelligent transport systems. Hence, future research work needs to investigate the associated economic impact of adopting a convergence network platform to support the integration of IoT with other paradigms.

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AN EXPLORATORY STUDY OF INTERNET OF THINGS (IOT) ADOPTION INTENTION IN LOGISTICS AND SUPPLY CHAIN MANAGEMENT

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Abstract

Purpose of this paper:

Internet of Things (IoT) envisions a global infrastructure of networked physical objects that render radical transparency to the supply chain. Despite perceived advantages of IoT, IoT-enabled logistics and supply chain management are still not widely adopted in industry. To understand the incentives and concerns behind firms' decisions to adopt IoT, the primary purpose of this paper is to explore determinant factors affecting IoT adoption in logistics and supply chain management.

Design/methodology/approach:

This study uses mixed methods research to explore determinants of IoT adoption intention in logistics and supply chain management. A qualitative analysis using grounded theory methodology is used to reveal underlying perceptions regarding logistic innovation with IoT. Quantitative hypotheses are then developed based on qualitative investigation and adoption literature. Survey data were collected from the managerial staff of Taiwanese firms across various industries. Structural equation modelling with partial least square is used for data analysis.

Findings:

The results of qualitative study identify uncertainties and issues regarding firms' intention to accept or reject IoT technology in logistics and supply chain management, including benefit and cost aspect of adopting IoT, perceived trustworthiness of IoT technology, and external pressure to embrace IoT. The resulting quantitative model shows that perceived benefits, perceived costs, and external pressure are significant determinants of IoT adoption intention, while technology trust is not. However, technology trust will indirectly influence IoT adoption intention through perceived benefits.

Value:

This paper is among the first known to examine IoT adoption intention in logistics and supply chain management using mixed methods research. The mixed methods approach offers a better insight in understanding incentives behind firms' decisions to adopt IoT than the use of either qualitative or quantitative methods alone.

Practical implications:

The empirical findings of this study can provide some guidelines for logistics and supply chain managers to evaluate IoT adoption in their firms.

Likewise, IoT solution providers can also benefit from this work by improving their solutions to mitigate the IoT adoption concerns addressed by this paper.

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Section 10: Logistics Modelling and simulation

LOSS-DETECTION MODEL WITH KANBAN CARD AND DETECTION ACCURACY IN LARGER LOT-SIZE

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Abstract

Purpose of this paper:

Consider a production process in which a worker chooses a piece of part according to the order displayed on the order sheet or display monitor. That process occurs commonly in many assembly lines, especially those associated with automobile production. Here we call a loss as a mistake according to part selection.

Takeo, Horikawa and Sugawara (2009, 2011) presented a loss-detection model of this problem for automobile assembly-line production. In the model, they use E-kanban cards to count the consumed parts. By counting number of products passing through the process, the loss possibility can be detected by the difference between numbers of consumed parts and those of passing products.

However, types of losses are ignored in the paper. For example, the loss probability for assembling part A instead of part B was assumed to be identical to the loss probability for assembling part B instead of part A, $p_A=p_B$.

Analyses of the model considering type of losses require much calculation if lot size K increases.

In this paper, we propose an analysis method for the loss-detection model whose lot size L is infinity based on Discrete-Time Markov Chain (Wolfe 1989). We present the outcome of numerical experiments for several combinations of loss probabilities where variety of parts is two to four.

Design/methodology/approach:

Our approach contains two steps. First is building Finite Markov Chain. We set number of states N for model size. Then define loss probabilities p_A, p_B, \dots, p_N for every combination in part selections. For state expression, we set (n_A, n_B) for model of $K=2$ where n_A, n_B represents difference between ideal parts stock and actual stock. With the probabilities and state expression, we draw State diagram of Discrete Markov Chain.

Second, we carry out numerical experiment for several combinations of parameters number of states N , variety of parts K and loss probabilities p_A, p_B, \dots . Calculations are made by using an x86 workstation, and the Jacobi method is employed to solve simultaneous equations.

Findings:

According to the outcome of numerical experiments, in every case, detection accuracy gets the worst when loss probabilities are identical, $p_A=p_B$. Detection accuracy gradually increases when loss probabilities get unbalanced.

Value:

The paper provides some characteristics of loss-detection model as numerical experiments with variety of parameter combinations. The characteristics will utilize for design of actual

production system. For industries in the developed countries, a concept of ICT supports like loss-detection model is expected to achieve higher productivity and quality.

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CONCURRENT SCHEDULER APPROACH WITH GENETIC ALGORITHM FOR ITEM DELIVERY BY USING SWARM OF UAVS

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Category for the Paper

Research paper

Purpose of the paper

This paper provides an effective solution to complete delivery in air by a group of UAVs. UAV Routing Problem (or) Vehicle Routing problem is solved by the assignment of UAVs in the concurrent way to reduce the delivery time.

Design/methodology/approach

Concurrent Scheduler approach is used together with Genetic Algorithm to achieve the best delivery assignment plan for the light weight items delivery. The best assignment is selected among generation by generation result of each assignment resulted from GA.

Findings

As the result, concurrent scheduler approach with GA can give an effective routing procedure by reducing almost a third of the total flight time accomplishment of the entire mission in comparison with the result from the simple flight time approach with GA alone.

Research limitations/implications

In this paper, GA algorithm is evaluated by using two chromosome representations of dynamic UAV chromosome and static target chromosome. For the next research, both representations are dynamically changed their fitness value during GA execution generation by generation.

Original/value of paper

Concurrent Scheduler approach is newly introduced to enhance the effectiveness of the GA algorithm in UAV routing problem.

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A NOVEL APPROACH TO THE STORAGE ASSIGNMENT IN AN ORDER PICKING SYSTEM

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Abstract

Purpose – In an order picking system, storage assignment deals with the determination of the best location of stock keeping units (SKU) and is one of the most effective strategy to control the efficiency and minimize costs. The aim of this work is to develop of an adaptive approach addressing storage assignment in order to minimize the total cost of travelling with a particular focus on picking activities. The proposed approach aims to efficiently handle seasonality in the products mix avoiding expensive periodic re-arrangements of the warehouse.

Methodology – We implement a greedy-heuristics based on SKU popularity, dynamically calculated, able to handle seasonality and frequent inventory–mix changes as in the case of 3PL provider warehouses. The proposed adaptive approach is embedded within a properly designed decision support tool which uses a numerical simulation to perform multi-scenario analyses and to validate the approach with real warehousing instances.

Findings – We apply the proposed approach with a 5,000 storage locations 3P warehouse dedicated to perishable biomedical products. The obtained results quantify consistent reduction of the travel time for the outbound activities. In particular, the expected travel time for the picking tours decreases of about 10% over the observed horizon.

Value – The proposed adaptive assignment policy does not require a labor-intensive re-arrangement of the storage layout, but exploit the daily incoming SKUs and the empty storage locations to reduce day-by-day the distance between the *as-is* and the *desirable* storage configuration.

Practical implication – The proposed approach is particularly suitable for those warehouses where the rapid response to the changing inventory mix is a strategic lever for market positioning (e.g. 3P warehouses). Furthermore, the proposed approach might be quickly enriched by constraints (e.g., conservation temperature) regarding the quality and safety of the inventory along the storage cycle.

Keywords: Storage assignment, Adaptive policy, Warehouse, Picking, 3PL, Perishable products

IMPLEMENTING META-HEURISTICS FOR AS/RS PICKING SCHEDULING IN SUPPORT OF PRODUCTION LINES

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Category of the paper: *Research Paper*

ABSTRACT

Purpose

For auto parts production that follows Toyota production principle, it may be organized in cells to produce a large variety of parts. Within the cells, the workers assemble the parts and the materials required are supplied by others. Before material handling automation is employed, material suppliers have to know which cells will be short of materials signaling from the lights above the cells and then find the necessary materials to supply. With the development of AS/RS (automated storage/retrieval system), the efficiency and flexibility is introduced to handle diverse kinds of materials thus it can be designed to process material storage and picking to supply parts required in the shop floor. AS/RS was traditionally applied to handle materials characterized as large in amount but small in variety. To design an AS/RS system capable of supporting materials required in the shop floor, the fundamental principle is in-time supply of multiple parts simultaneously to avoid production stoppage. Thus it is imperative to carefully analyze and design the AS/RS – production system in order for the AS/RS to be flexible in supplying a variety of materials and efficient in dealing with the large amount required in time. Despite there were some studies on AS/RS sequencing problems, none of them look into the sequencing problem in support of shop floor demand patterns (Oliveira, 2007; Roodbergen and Vis, 2009). The main difference is that in pure AS/RS sequencing problems, we look into the optimal sequencing of AS/RS itself; while in the support of shop floor manufacturing, the sequencing is under the constraint of shop floor scheduling. In this paper, we study the sequencing problem, both storage and picking sequences, of an AS/RS, capability of dual command cycles, in support of a Toyota manufacturing system where production lines are composed of cells to assemble simultaneously a variety of products such as auto parts, electronic devices, etc.

Research approach

Tabu search was proposed by Glover (1986) as a metaheuristic algorithm employing local search methods for optimization. It embeds with a memory list to avoid searching into wrong directions or previous unfavored solutions to dodge being stuck in local optimum for better searching efficiency. It has widely been used in solving large-scale problems (Sung et al., 2007). Meeting with diverse problems, different strategies for Tabu search are schemed and they comprise: 1. Initialization strategy, 2. Move strategy, 3. Tabu list generation, 4. Aspiration criteria definition, 5. Candidate list generation and 6. Stopping criteria definition. In this paper, three Tabu heuristic algorithms were devised with variations in search and exchange. The first algorithm (TI) is a regular Tabu search with special initial solution strategy;

the second algorithm (TID) combines TI with divide and conquer search strategy; the third algorithm (TIE) is TI with special exchange strategy.

Findings and Originality

To experiment on the performance of the Tabu algorithms proposed and to see if they can come up with the sequences of storage and picking in a short possible time for practical application, we experimented on an AS/RS – production system having 40 assembly cells and an AS/RS with capacity of 1600 baskets for holding materials for assembly. By making 30 runs for each of the above three algorithms, we found that that TIE performs the best, followed by TID and then TI. It also demonstrates that Tabu search can help the operation of AS/RS by reducing 1-20% of shop floor assembly time while TIE can obtain a sequence solution in the best possible time by saving 54.9% of the computation time over TI.

Keywords: AS/RS, Tabu search, Production support, Divide and conquer

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ON RECONCILING MICRO AND MACRO ENERGY TRANSPORT FORECASTS

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Abstract

Purpose of this paper:

Shipping freight prices are characterised by volatility, seasonality and sensitivity to energy prices and market sentiment. Earning levels are considered to be mean-reverting in the long-run and subject to demand and supply imbalance in the short-run. On one hand, demand for shipping transport is a derived demand that depends on the state of the international seaborne trade. On the other hand, supply for energy transport is subject to availability and productivity of the fleet. This work investigates ways to bridge the differences and improve forecasting macro and micro levels in the energy transport sector.

Design/methodology/approach:

Establish approaches in the energy literature are employed for forecasting the demand and supply for energy transport. Consequently, hierarchical time series approaches (top-down, middle-out, bottom-up, optimal combination) are applied and contrasted in order to identify the most suitable hierarchical approach in the case of energy transport.

Findings:

We provide suggestions for optimal hierarchical reconciliation in the energy transport sector. Also, we show that combining forecasts from macro and micro levels may lead to improved forecasting performance.

Value:

This research study explores for the first time how reconciliation of forecasts produced at macro and micro levels can bring benefits in the energy transport sector.

Research limitations/implications (if applicable):

This work focuses on the application of hierarchical approaches to energy transport on a monthly data frequency. Extensions could focus on alternative data frequencies, or even producing combinations of forecasts across multiple levels of temporal aggregation.

Practical implications:

Shipping practitioners (shipowners, charters, brokers, investors) will benefit from more informed decisions. This comes as the direct result of reconciled forecasts on macro and micro levels that take into account information at various level of the hierarchy.

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Category: Research paper

Keywords: energy transport, forecasting, hierarchy, reconciliation

CASE STUDY: DYNAMIC DISCRETE MODEL OF FIXED ORDER POINT QUANTITY SYSTEM FOR INVENTORIES IN PHARMACEUTICAL DISTRIBUTION

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ABSTRACT

Purpose of this paper:

The reason for writing this paper is development of dynamic discrete model of fixed order point quantity system for solving problem of control and ordering inventories in pharmaceutical distribution.

Design/methodology/approach:

This paper analyses inventory system of pharmaceutical company, with continuously changing state of sales. Changes of state of inventories are registered at the ends of the defined time period. Considered time period is one or two years. Dynamics of system are described by discrete equations and inequalities. Structure of inventory system is generally known (sales forecast per months), and has deterministic character, while the variables in the system may have deterministic and stochastic character. Inventory control problem set in this paper is modelled and presented in spreadsheets. Spreadsheets are used for building of decision model of a discrete controlled object. The results obtained from discrete dynamic spreadsheet model are used for procurement planning more than 50 products per country for five countries from East Central Europe for the year 2016.

Findings:

Simulation model should be able to present a dynamic of inventory system, and to give exact proposal for ordering of products in an acceptable time for discrete periods in one year. Also, model will eliminate shortages of theoretically based models by "book" and show what kind of limitations, in reality, can be appear in the process of design of dynamic inventory model.

Value:

The main objective of this study was to develop a dynamic discrete inventory decision ordering model in spreadsheets, in accordance with the problems defined in company. The originality of the paper will be shown in fact that the company will be able to use the model for all procurement operations. From theoretical aspect value of the paper is to show the critical attitude for limitations of theoretical inventories models.

Research limitations/implications (if applicable):

Mathematical apparatus, that is used to solve the problem of managing, is optimal control of the discrete system. Inventory problem, set in this paper, is modelled and presented in spreadsheets. Spreadsheet is used for building of simulation model of a discrete controlled object. Discrete controlled object is represented by simulation model of inventory management problems, with clearly separated: the law of dynamics, control domain and performance criterion. In this paper we will try to present that dynamic simulation spreadsheet inventory model can be used as reliable and easy way to present a static inventory models.

Practical implications (if applicable):

The practical contribution of this paper by should be prove that the dynamic simulation spreadsheet inventory model can be used as reliable and easy way for control and ordering

of inventories in pharmaceutical distribution. In reality, two models will be applied: Fixed Order Quantity model with cumulative sales forecast (for the few same brand products for different countries) with minimal order quantity (MOQ) defined by supplier and the Lot-for-Lot model for each product with exactly needed order quantity for three months of sales. Model will be applied over the real data collected in the company.

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STACKELBERG GAME STUDY ON THE SCHEDULING PATTERN CHOICE OF MANUFACTURER AND DISTRIBUTOR

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Abstract

Purpose of this paper:

Production waiting always happens on the manufacturer major's supply chain, which leads a lot of inventory, and the cost. The manufacturer wants to make the scheduling base on its benefit, and the distributor as the after action point, can obtain the information from the manufacturer's action, then revise the scheduling base on it's own benefit, therefore, it is Stackelberg Games between manufacturer and distributor. How to make the best scheduling for the manufacturer and distributor is significant to reduce the inventory cost, the supply chain cost, and to accelerate the supply chain's responsiveness.

Design/methodology/approach:

The study use the Game theory, in the course of the game, there are two strategies for manufacturer and distributor: coordinate the other's scheduling mode, or choose their own optimal scheduling model. Manufacturer selects the operation mode first, the distributor grasp the manufacturer's action, then make the scheduling model, the manufacturer don't know the action of the distributor, then in a passive position. Throughout the course of the game, there is asymmetric information between manufacturer and distributor, the distributor have the after mover advantage. in the Stacklberg game. The paper is a study of this issue that manufacturer and distributor's stacklberg game under asymmetric information problems

Findings:

In the course of manufacturer and distributor's selection scheduling game, the manufacturer at a disadvantage, the manufacturer only by improving its scheduling mode and incentives designed, can ensure distributor choose the action of coordinated scheduling mode.

Manufacturer can adjust the production order without change the number of production conversions, that is when you need to produce the kind of product family is n , which is the first production of the product family will not change the production conversions, then product the shorter lead time produce first, neither increase the cost, nor to reduce the time compression cost for the distributor, so it will increase the distributor's willingness to coordinate.

The experimental results show that, if the distributor coordinates the manufacturer's optimal scheduling, it will lose 10%-20% cost, if the distributor choose its own optimal scheduling, the manufacturer will increase 88.41 percent of the average inventory cost. The result of table 3 shows that:

By reordering the manufacturer's production module can reduce two-thirds cost for the distributor.

The study get a corollary: there is only a small part of the time compression costs of distributor is caused by the manufacturer's production methods, which can reduce production conversion costs, while the most part of cost is from the manufacturer's sort improper production.

Value:

Previous studies are from the perspective of reducing the cost of production and distribution scheduling, establish a coordinated scheduling model of production and distribution, these studies provide a theoretical basis for this study, this paper focuses on the manufacturer major's supply chain, base on game theory, establish a scheduling game model for manufacturer and distribution. Standing on the manufacturer's position, design the incentives for the distribution, to ensure that manufacturers and distribution achieve their own interests.

Research limitations/implications (if applicable):

This paper solves the supply chain scheduling problem on operational level based on the game theory. The further research will focus on the supply chain scheduling problem form different supply chain structures and different modes of production in depth.

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A SIMULATION MODEL FOR CONTINGENCY PLANNING IN SUPPLY CHAIN MITIGATION DUE TO DISASTER DISRUPTION

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Abstract

Purpose of this paper

Enterprises with global supply networks are at risk of lost revenue as a result of disruptive disasters at supplier locations. Identification, assessment and response to such risks of disruption are necessary tasks in the modern supply chain management (Tummala, et al., 2011). Corporations, as well as various professional societies including the International Symposium on Logistics, have advancing interest in this issue. An assortment of literature regarding methods to mitigate loss in the event of disruption exists.

Breuer, et al. (2013) proposed a combined approach of discrete-event simulation and decision trees for, "reactive risk management" (p. 218). Schmitt and Singh (2009) created a simulation model that assesses the impact of a supply chain's vulnerability to disruption on customer service and used Monte Carlo simulation to generate probabilistic distributions for disruption risk which are then used in discrete-event simulation.

A framework to support Business Continuity Planning (BCP), both mitigation and contingency, prior to the event of a given disruption is proposed by this article. A combined approach of risk index optimization (for expected financial loss) and of a discrete-event simulation model is used to determine the best set of responses to mitigate multiple disruption risks in a supply chain.

Design/Methodology/Approach

Supply chain vulnerability to disaster disruption is modeled through Simio discrete-event simulation software. Information regarding disaster probabilities is drawn from the Global Data Risk Platform tool of the United Nations Office for Disaster Risk Reduction website. Monte Carlo simulation is used to generate multi-hazard risk distributions. Responses that together cause the most financial savings are found through risk index assessment. The discrete-event simulation is used again to reassess the supply chain network vulnerability to disruption after a response combination has been implemented. Results of the simulation experiments (cost of implementation, average inventory level, unmet customer demand, and production loss) provide more detailed insight regarding the net gain after responses and are compared for final use.

Findings

Our study tested a set of historical data from a large manufacturing company. Results show that

- (1) the discrete-event simulation model is accurate in simulating historical production loss;
- (2) the combined approach method tests the feasibility of all mitigation and contingency plan options and holds in a variety of risk and cost scenarios.

Value

Integration of discrete-event simulation for BCP is demonstrated. A risk index optimization model acts as an accurate and quick alternative to testing disaster recovery responses to narrow down most cost-effective response combinations. Successive analysis in discrete-event simulation of response combinations provides detailed metrics for use by supply chain management.

Research limitations/implications

Corporate information regarding this topic is limited due to its classified and competitive nature. The decision model developed by this study was tested successfully with a historical business scenario received from a professional with extensive experience in the field. Additional implementation of the model and demonstration of its success will further suggest the strength of combining risk index assessment and discrete-event simulation for BCP decision support.

Practical implications

The risk index framework and simulation model are customizable for use in supply chain risk management setting. Simio software, which has not yet been used in similar published studies, offers an object-oriented approach with associated benefits including a convenient 'Reliability Logic' property and logical illustration of the supply chain being model.

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Section 11: Food and agriculture logistics

MANAGING A SUSTAINABLE AND RESILIENT CHEESE SUPPLY CHAIN FOR THE DYNAMIC MARKET

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Abstract

Purpose of this paper:

The cheese industry is special: production start-up is pull. Once started, however, the process becomes push. The entire process to make cheese takes around a week. However, most of the production lead time involves waiting. Depending on the type of cheese, the product has to mature for two to sixteen weeks. Despite its long production time, cheese is perishable. If it is not delivered to customers in time, it does not have value any more. Any product shortage causes customers to seek alternative sources of supply (Gonçalves et al., 2005). To manage a sustainable (i.e. short throughput time) and resilient (i.e. few lost sales) cheese supply chain for the dynamic market (i.e. endogenous demand) is difficult, and thus becomes the focus of this paper.

Design/methodology/approach:

A system dynamics simulation is applied to study a supply chain with three tiers: a producer, a logistics service provider (LSP), and a retailer. Seven balanced feedback loops and two reinforced feedback loops are identified from the simulation model. They are: B1: Producer information delay; B2: Producer capacity availability; B3: LSP capacity availability; B4: LSP order fulfillment (push); B5: Lost sales; B6: Retailer information delay; B7: Retailer sales availability; and R1: Producer order fulfillment (pull); R2: Maintained sales. Two types of disruptions that cause product shortages are selected to simulate: a producer capacity disruption and an LSP capacity disruption. A behavioral approach to feedback loop dominance analysis (Ford, 1999) is applied to identify dominant feedback loops for each disruption recovery.

Findings:

For a producer capacity disruption recovery: B1, B2, B3, B4, B5, and R2 are identified as the dominant feedback loops to help maintain a sustainable cheese supply chain. Meanwhile, B4, B5, and B6 are helpful to build a resilient cheese supply chain. For an LSP capacity disruption recovery: B3, B4, B5, and R2 influence the sustainability of a cheese supply chain. Moreover, to keep the resilience of a cheese supply chain, B3, B4, B5, and B6 are worth paying attention to.

Value:

Through the feedback loop dominance analysis, this research has set the first step to manage a sustainable and resilient cheese supply chain for the dynamic market, when the supply chain faces a product shortage (either by a producer capacity disruption or an LSP capacity disruption). Further investments can thus be targeted at the identified dominant feedback loops to ensure cost efficient improvements.

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DEVELOPMENT AND VALIDATION OF A MEASUREMENT INSTRUMENT FOR HALAL FOOD SUPPLY CHAIN IMPLEMENTATION

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ABSTRACT

Purpose of this paper: This study develops and validates the dimensions for the halal food supply chain implementation (HFSCI) model and confirms the measurement model using four underlying dimensions.

Design/methodology/approach: The items of the dimensions used in the model are developed and validated based on a comprehensive multi-step approach prior to the large-scale survey. A questionnaire-based survey is distributed to 600 Malaysian halal certified food and beverage organisations. A total of 240 usable questionnaires are collected to confirm the underlying dimensions empirically. Confirmatory factor analysis is conducted to examine the measurement models of HFSCI, both for first-order and the higher-order measurement models.

Findings: The results suggest that all four dimensions including physical attributes, process capability, ethical practice, and management capability significantly define the HFSCI model. The results also suggest that both the first-order and the second-order models for HFSCI are reliable and valid.

Value: To our knowledge this is the first attempt to develop and validate the measurement instrument for HFSCI. Thus theoretically this study contributes to the body of knowledge regarding implementation dimensions of halal food supply chain. Furthermore, it provides a valid measurement instrument for further research in the context of other countries and markets.

Research limitations/implications (if applicable): The study is in the context of the halal food supply chains of processed food and beverage industry sector. Therefore, the results of this study may not be generalised for other industry sectors such as cosmetics and personal care and healthcare and pharmaceuticals.

Practical implications (if applicable): The findings of this study can be used as a guide to future practices. Furthermore, the validated items and dimensions may assist managers to identify areas for improvement and to formulate strategic initiatives in the halal food industry.

Keywords: Halal, Halal Food Supply Chain Implementation, Processed Foods and Beverages

DEVELOPMENT OF A FRAMEWORK FOR BIG DATA ANALYTICS IN COLD CHAIN LOGISTICS

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Category of the paper: Research paper

ABSTRACT

Purpose of this paper

The safety of the products handled in the cold chain (CC) is very sensitive to freshness and can easily cause adverse effects on human health and on prices. Developing countries, such as China, have to deal with diverse problems including lack of temperature standards, deficient infrastructural facilities, out-of-date technologies, and shortage of professionals (Luo et al., 2016). Recent advances in ubiquitous technologies, particularly wireless sensor networks, can help tracking the data in CC for traceability control, food safety and security, risk management issues. Even if technologies are available, there is a lack of understanding of the appropriate data points to be collected, and the appropriate technologies to be used when collecting such data. In addition, it remains unclear how 'big data' can be effectively used for improved decision making.

Design/methodology/approach

The framework is designed based on a systematic literature review on applications of ICT in cold chains. We used the search string ("cold chain" AND food OR (technology OR "ubiquitous technology") OR (RFID OR sensors) OR ("big data" OR "internet of things")) using ABI-INFORM database. The review was followed by an exploratory workshop where researchers and industry participants were asked to provide their thoughts on next generation CCs, barriers, possible mechanisms to overcome those barriers and to identify future research opportunities.

Findings

Our review shows that the data that are useful for CCs are covering both the more traditional

environmental conditions such as temperature, but also begins to expand more towards capturing product conditions. Even temperature data are mostly not exchanged within the CCs; there is a lack of “SC thinking”. The adoption of electronic traceability systems in order to improve the food supply chain has not been as fast as expected. Moreover, there is limited discussion of how analytics capability may impact overall CC performance in terms of responsiveness, cost efficiency, environment footprint, flexibility etc. The study developed a decision making framework for investing in technology in CCs.

What is original/value of paper

This paper is one of the earliest to recognize the need for a comprehensive framework for adoption and application of ‘big data’ analytics in CC management. It has value for researchers since it provides directions for future research to demonstrate how seamless decision making using “big data” can help improve overall performance of the CCs. The value for practitioners is in proposing a step-by step decision making framework for developing ‘big data’ analytics capabilities across the CC.

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DEVELOPING A SUSTAINABLE COLD CHAIN IN EMERGING MARKETS: INSIGHTS FROM CASE STUDIES IN CHINA

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Abstract

Purpose of this paper:

This paper aims to summarize practices conducted by Chinese logistics service providers for developing a sustainable cold chain. The economic, social and environmental outcomes of these practices are examined. By depicting key features of tasks and the institutional environment in which a cold chain is embedded, both internal and external inhibitors, which significantly hinder the development of a sustainable cold chain, are identified. Finally, some insights are generated and some suggestions are proposed.

Design/methodology/approach:

Five cold chain logistics service providers in China from different industries are selected as cases. These firms deal with the business of perishable food, beverages, tobaccos, pharmaceuticals and reagents, which nearly cover all representative products in cold chains. A literature review is conducted for elaborating the framework of semi-structured interviews. For the principal of triangulation, key informants from different levels in each firm are recruited, and some other sources of materials, such as archive and on-site observations, are also complemented. Then we code these materials for further analysis.

Findings:

Our preliminary study confirms that the cold chain has its uniqueness as a special logistics service. Since cold chain logistics is still in its very early development stage in emerging markets, practices are influenced significantly by legal and industrial institutions. To achieve a sustainable cold chain, more efforts are required from both the government and firms.

Value:

This paper is among the earliest studies attempting to describe and categorize cold chain practices. It also reveals the economic, social and environmental outcomes from different practices. A deeper understanding of the cold chain environment and its inhibitors extends the knowledge landscape of this research area. In addition, all these contributions pave the way for further cold chain empirical studies.

Practical implications:

Decision makers can leverage the results of this research as a tool kit or guidelines for improving their own practices and developing a more tailored sustainable cold chain strategy.

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COLD SUPPLY CHAIN EXPENSIVE OR MISCONCEPTION: RESEARCH FRAMEWORK AND FUTURE RESEARCH DIRECTIONS

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Abstract

Purpose: Effective monitoring and control of cold supply chain is essential to preserve the quality of temperature sensitive products but often not widely practiced due to huge costs involved in transporting, storing and handling perishable products at various stages of the supply chain. Previous studies have shown that inappropriate practices in the management of cold supply chains contribute adversely to the environment, carbon footprint as well as food waste. Given that there is a considerable waste of perishable products due to factors like non-availability of proper storage, transport and handling facilities, this raises an open question why the management of cold supply chain is so expensive or is it simply a misconception. This study attempts to understand the cost issues appertaining to cold chain's chemical, biological and technological processes as well as various stages of handling processes such as the preparation, storage, transportation and monitoring of perishable products.

Methodology: We employed a focus group approach coupled with comprehensive literature review to categorise various cost challenges. The focus group included senior researchers and professional with substantial experience in cold and supply chain operations. The focus group started with open questions related to cost from each participant and the responses were categorised into sections such as investments in infrastructure, transport, cost of allocation or sharing resources and quality. Subsequently, the group identified major barriers related to cold chain costs such as preparedness of investors, market scale in terms of efficiency, market acceptance and diversity of perishable products. Based on the summary of discussion the study carried out detail investigation of past studies to understand critical research gaps related to cost category classification.

Findings: Initial findings of cost issues with respect to each category are requirement of higher initial investment for creation of basic facilities and identification of suitable infrastructure under investment category, high cost of last mile transport, cost of linkages between different transport modes and exploration of arctic routes under transport category; sharing increased cost among supply chain players, measuring real cost of cold chain, balancing cost structure between inventory consolidation and transportation and cost involved in regional distribution. Typical issues related to quality are customer awareness towards cost of chilled/frozen foods, way forward to reduce loss of perishable products with respect to country and industry contexts, monitor and control of quality over time and labour costs.

Value: The study is an attempt to decode the misconception of cost issues related to cold chain based on its science, technology and processes.

Research limitation: The study identifies potential research gaps based on a focused group and comprehensive literature review which needs to be further underpinned with empirical evidence to deal with potential issues according to specific industry and country contexts.

Practical implications: The study would be useful to practitioners to better understand potential options and research pathways relating to cost issues. These could include, how to model perishable products supply chain considering location, allocation and transportation that will increase market share of all stakeholders? How to use big data analysis for market acceptance considering sales characteristics? How to deal diversity of perishable goods more efficiently.

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Section 12: Supply chain performance management

THE IMPACT OF SUPPLY CHAIN STRATEGY ON THE FINANCIAL PERFORMANCE: A CASE STUDY OF A MANUFACTURING COMPANY

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Abstract

Purpose of this paper:

The aim of this paper is to propose a systems view to link supply chain (SC) strategy to a company's financial performance by developing a scenario approach. The paper applies five scenarios under differing financial performance contexts to analyse the relationship between supply chain performance and the overall financial performance.

Design/methodology/approach:

An integrated supply chain performance measurement system was created and implemented to demonstrate and utilise the relationship between SC performance metrics and the financial performance metrics. A scenario analysis approach was undertaken using five main alternative scenarios in order to explore how this procedure could be applied with regard to various possible financial results. A case study of a manufacturing company was conducted and analysed to illustrate the applicability of the research procedure.

Findings:

The results reflected the improvement in the efficiency and the effectiveness of SC strategy in connection with the company's short-term strategic financial objectives. The analysis showed that any improvement in the SC operations' performance will lead to better supply chain management (SCM), and consequently enhance the company's overall financial performance. An improvement in SC performance as well as financial performance has been shown for the three conditions (optimistic, normal and pessimistic) following the proposed procedure.

Value:

A systems view is introduced to integrate SC strategy and the company's overall financial strategy under different possible scenarios based on the systems view problem-solving model. Five main alternative scenarios are defined given the related targeted financial outcomes and their corresponding present paths (managing SC costs, increasing SC agility, improving SC reliability, increasing SC responsiveness and managing SC assets).

The system can be operated in two directions given two possible loops. A company can formulate SC strategy to achieve targeted strategic financial objectives or it can start with an unsatisfactory financial performance and then formulate the corresponding SC strategy to enhance it.

Research limitations/implications:

The research study makes an original contribution in the direction of linking SC strategy to a company's financial strategy through focusing on studying the relationships between SCM practices and financial performance improvements. Further research should investigate and

compare the results from several companies in different sectors of manufacturers in different locations.

Practical implications:

The paper follows a systems view which can help in determining the most appropriate SC strategy with regard to targeted financial objectives. This paper benefits from data extracted from a manufacturing company by evaluating the applicability of the model developed under a different set of scenarios.

References:

Supply chain strategy, Supply chain performance, Financial performance, Supply chain financial link, Scenario analysis approach

INVESTIGATING STOCK-OUTS IN THE WAREHOUSE RETAIL LIQUOR SECTOR IN JOHANNESBURG

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ABSTRACT

Purpose of this paper: Inefficiencies in three management levers namely; the management of demand variability, supply chain synchronisation and collaboration, have been found to be probable causes of stock-outs. Many retail businesses in South Africa face the phenomena of stock-outs, resulting in lost sales. The aim of this exploratory study is to investigate management practices that contribute to stock-outs in warehouse retail liquor retailers in Johannesburg.

Research design and methodology: The focus of this study was formal trade warehouse retail outlets that sell to other retailers as well as consumers in Johannesburg. A multi-case approach was used to determine the association between business management practices and stock-outs. To improve the generalisability of the findings, five general methodological phases were used. First, three research questions were formulated. Second, a questionnaire was developed; third, field data were gathered; fourth, interviews were transcribed and analysis performed using coding schemes and cross-case comparisons; and finally, findings were disseminated to improve validity. Interviews were conducted with managers in the areas of procurement, sales and supply chain management from the retailers.

Findings: The results revealed that retailers based demand forecasting on judgement, naïve or simple moving average forecast methods. As a result during periods of unusual activity, demand was difficult to predict. Excel spread sheets and computerised systems were utilised to track demand. There was no evidence of data analysis or use of forecasting methods. Inventory decisions were based on simple standards set by management. There was no consideration of advanced modelling that included variability, lead-time or a targeted customer service level to achieve optimal inventory levels. Instead safety stock involved holding a two week stock cover for all products throughout the year, leading to stock-outs particularly in periods of unusual activity. Store operations were adhered to and thus were not a hindrance in fulfilling customer demand. However, product breakages were common implying that data inaccuracies and stock-outs were probable. The sharing of information between the retailers and suppliers was lacking as there were no formal collaboration programmes. Suppliers thus lacked the flexibility to react to retailers' needs.

Value: This exploratory study extends existing literature by synthesising two research areas, i.e. supply chain management practices and stock-outs, to illustrate the effects of these on each other. Additionally, empirical evidence of this relationship from the warehouse retail liquor businesses in Johannesburg is provided.

The limitations of this study are that the results are based on the opinions of respondents and may present a bias by describing adequate competency when interviewed.

Practical implications: It is recommended that, where stock-outs are the result of trends and seasonality, management consider other methods of forecasting. In addition, collaboration with suppliers should be established to improve synchronisation. This will enable flexibility to quickly react to retailer's needs and ensure that customer service quality is maintained. Improvements in three focus areas namely; demand forecasting, collaboration

and training of employees will assist in closing the gap of poor management practices in retail outlets and reduce stock-outs.

APPLYING SIX-SIGMA AND DMAIC METHODS FOR PROCESS IMPROVEMENT BY A CAR IMPORTER IN THAILAND

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ABSTRACT

Purpose This research paper investigates and solves a transport delay problem in the import of cars, by sea from Germany, by an automotive company in Thailand. It identifies the current process, possible improvements by the company, and guidelines for the 3PLs involved.

Design The research methodology used a combination of Six-Sigma and DMAIC techniques. Six-Sigma is a quantitative problem-solving method which uses statistical tools for process improvement by expelling quality defects. DMAIC is a data-driven cycle for improving and sustaining business processes, and is used to drive Six Sigma projects. Also, interviews were conducted with the company management, 3PLs, Customs, and the Transporter company.

Findings The lead time was reduced from 15 days to 6 days, by eliminating problems and errors within the company (such as cheque approval and release time), and in 3PLs (such as extra storage charges, and errors in billing and sea freight rates), and in Customs (such as inspection and release time), and in the Transporter company (such as delivery delays). All unnecessary costs were eliminated. such as storage charges and billing errors, amounting to US\$100,000 p.a..

Value International trade chains, for imports and exports, are common and vulnerable. This paper's research analysis methods are popular but may suffer from insufficient attention to their limitations, which are explored here. The results could encourage other importers to tackle delay problems in which several parties are involved.

Research Limitations As there was only one focus company, in one country, the findings cannot be generalized. The data for analysis was limited to one complete year, 2014, which may not have been fully representative. Future research could extend the data period, and include other factors and models, as well as surveying customer satisfaction.

Practical Implications The identified problems and proposed improvements were accepted and implemented by the company and its external partners, and a plan made to maintain the improvements with a continuous review schedule. Other companies might profit from this report.

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A SYSTEMATIC REVIEW OF THE LOGISTICS AND SUPPLY CHAIN PERFORMANCE MEASUREMENT LITERATURE

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ABSTRACT

Purpose – The purpose of this paper is to provide a systematic review of the logistics and supply chain performance measurement literature that is combined with a citation network analysis. This will enable an identification of the main research clusters in the field of logistics and supply chain performance measurement.

Design/methodology/approach - A systematic review of the literature identified 38 scientific articles from 28 journals during the 2005-2015 period. The systematic review describes the article type, data collection method, year of publication, data analysis method, methodology and research context. The main research clusters were identified by following the guideline of Main Path Analysis (MPA) and analysed with the Pajek software 4.01.

Findings – There are two main findings from this systematic review. The first finding is that the majority of reviewed articles are published in engineering and others journals, such as economics and humanitarian. However, only 32% of the articles on the subject under review are published from logistics and supply chain journals. The main type of published research is based on empirical data with modelling and survey being the main research method. Conceptual or even other types of review are quite scarce. The second finding is that logistics and supply chain performance measurement can be split into 2 main research streams which are related to supply chain performance perspectives with six research clusters and another stream that focuses on measurement and metrics.

Research limitations/limitations - This manuscript only considered only published scientific articles but there are other sources that could be considered type as conference paper, trade journal, and white papers.

Practical implications - This systematic review provides practitioners and scholars with a classification of research clusters in logistics and supply chain performance measurement. (1) scope of performance measurement (2) total quality aspect (3) efficiency and efficacy (4) performance measurement KPIs (5) performance measurement method (6) impact of measurement system on firm's performance and (7) metrics measurement.

Originality/Value - There are many ways to measure the performance in logistics and supply chain management which depends on the objective or framework.

Keywords: Systematic review, Logistics and supply chain management, Performance measurement

Paper type: Literature Review

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HOSPITAL-SUPPLIER INTEGRATION AND HOSPITAL PERFORMANCE: EVIDENCE FROM THE SAUDI ARABIAN HEALTHCARE SYSTEM

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ABSTRACT

One of the priorities of the healthcare sector is to minimise costs and to enhance the quality of service provided. The integration between hospitals and suppliers is a major factor associated with the cost of managing and operating the relevant supply chains. Quantifying the relationship between the measures of hospital-supplier integration and hospital performance can provide useful insights to minimise costs and improve the quality of service. There are limited studies which have undertaken such research into the hospital-supplier integration and hospital performance in the context of Saudi Arabia. A quantitative survey of the senior management of Saudi Arabian hospitals was undertaken to collect data about measures of hospital-supplier integration and hospital performance. The survey was designed based on an extensive review of relevant literature, and included measures of hospital-supplier integration and hospital performance, namely, logistics integration, information technology integration, information sharing, and trust; and quality, speed, cost and flexibility, respectively. The results of a confirmatory factor analysis (CFA) analysis found logistics integration and trust to be positively and significantly associated with hospital performance. Out of these, trust had a stronger association with hospital performance compared to logistics integration. This information can be utilised by healthcare managers in Saudi Arabia to improve hospital performance by optimising the above-mentioned measure of hospital-supplier integration.

A STUDY ON THE ATTRACTIVENESS INDEX OF CHINA (SHANGHAI) PILOT FREE TRADE ZONE

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Abstract

Purpose of this paper:

In the last three decades, China is the major contributor to the Asian economic development by manufacturing large amounts of consumer goods. With the rapid growth in labour cost, the expectation on the enforcement of more strict environmental regulations, and the insourcing policy in the EU and the USA, Chinese government has decided to include the logistics businesses as one of her eight core national industries in the 12th five years development plan during 2011~2015. Logistics industry, a major enabler of internet commerce economics, is once again listed as a core industry for China's 13th national five-year development plan. Free trade zone is an innovative logistics operation model in China since July 2013 and is perceived to be one of the key successful factors for future economic growth in China. Many favourable incentives are provided to businesses that will set up their headquarters in the free trade zone. However the attractiveness of these incentives to its potential customers has not been studied thus far. This research intends to investigate critical factors influencing the successfulness of a free trade zone and provide suggestions to improve the degree of attractiveness of the trade zone to its regulators.

Design/methodology/approach:

Questionnaires are sent to the top 100 financial companies, the top 500 companies in the service industry and the top 1000 manufacturing companies in Taiwan to understand their perception on the degree of importance and the degree of performance of the major incentives promoted by the China (Shanghai) Pilot Free Trade Zones (CSPFTZ), and their intention to set up their offices in the CSPFTZ. The posted questionnaires are returned between Jan./2015 to Oct./2015, 129 copies of questionnaires are returned and 90 of them are fully completed to be valid for this research analysis. The importance-performance analysis (IPA) technique and the binary logistical regression technique are used to analyze the critical successful factors that attract the companies to set up their offices in the CSPFTZ.

Findings:

It is found 46.51% of the respondents either intends to or have already set up their offices in a free trade zone. The 27 sub-attractiveness indices can be grouped into the following 7 dimensions: government-related, strategy-related, service-related, facility-related, labour-related, operation-related, and market-related dimensions. The research results indicate the following 8 sub-attractiveness indices are perceived to have higher degree of importance and lower degree of performance: Favourable trade strategy, convenient custom clearance practices, healthy fiscal policy, innovative service contents, strong FTZ's promise fulfilment ability, relaxing FTZ investment regulations, relaxing regulations on accesses to raw material in the FTZ, and the removing government agencies corruption. In addition to the IPA matrix, this study employs Binary Logistic Regression technique to analyze the impact of the 27 possible sub-attractiveness indices on these respondents' decisions to set up their offices in the Shanghai FTZ. The amount of logistics Transport cost, flexible custom clearance procedure, and the Negative List of Commodities ("the List of Commodities subject to import restriction") are found to significantly influence manufacturers' willingness to move to the FTZ or not (Table 1). With these 27 independent variables, the classification table indicates the proposed binary logistics regression equation has a 77.8% correction prediction rate (Table 2).

Value:

CSPFTZ is officially operated and launched in July 2013 and has attracted 12,000 companies to register and set up their offices inside the CSPFTZ within one year after its launch. Many countries have also ambitiously launched their FTZ. According to the authors' knowledge, the major successful factors for a modern FTZ (such as the one in Shanghai) have not been studied before. This is the first research to indicate factors that are required to invest more resources to effectively improve a FTZ's overall attractiveness to its users. Governments plan to set up their FTZ can use this research findings to allocate their limited resources to improve their performance on these three key attractive sub-indices.

Table 2 Predicted PercentageCorrect

ClassificationTable^a

		Observed	Predicted		Percentage Correct
			1.		
			0	1	
Step 1	0		59	6	90.8
	1		14	11	44.0
	Overall Percentate				77.8

a. The cut value is .500

Source: this research

Table 1 Binary Logistics Regression Result

Variables in the Equation

	B	S.E,	Wals	df	Sig.	Exp(B)	95% C.I. for EXP(B)	
							Lower	Upper
politics	-.005	.586	.000	1	.993	.995	.315	3.138
diplomats	-.475	.676	.492	1	.483	.622	.165	2.342
Corruption	-.396	.622	.405	1	.525	.673	.199	2.278
Terrorism	.811	.527	2.374	1	.123	2.251	.802	6.318
EconomiesofScale	1.106	1.147	.928	1	.335	3.021	.319	28.635
Competitiveness	.947	.941	1.013	1	.314	2.579	.408	16.308
LandArea	-.773	.723	1.142	1	.285	.462	.112	1.906
RawMaterial	-.235	.737	.102	1	.750	.790	.186	3.354
ICTfacilities	-.019	.802	.001	1	.981	.981	.204	4.724
LogisticsTransportCost	-2.172	.850	6.529	1	.011	.114	.022	.603
Step 1 ^a LabourCost	.114	.817	.020	1	.889	1.121	.226	5.563
EnvironmentLaw	.114	.798	.020	1	.887	1.120	.235	5.349
ResearchAndDevelopm ent	-.490	.757	.419	1	.517	.613	.139	2.700
MarketSize	-.661	.684	.932	1	.334	.517	.135	1.975
MarketOpeness	-.264	.675	.153	1	.695	.768	.204	2.884
InflationGDP	1.334	.949	1.978	1	.160	3.797	.592	24.375
ManufacturingSkill	.612	.763	.643	1	.423	1.844	.413	8.221
TradeFacility	.545	.759	.516	1	.472	1.725	.390	7.628
LoanRegulation	-.661	.665	.988	1	.320	.516	.140	1.901
GovernmentReform	-.254	.735	.120	1	.730	.776	.184	3.277

CustomPractice	1.770	.931	3.619	1	.057	5.872	.948	36.380
NegativeListOfCommodities	-2.396	.981	5.960	1	.015	.091	.013	.624
CrossBorderLoan	-.067	.749	.008	1	.928	.935	.216	4.054
FreeExchangeRMB	.753	.663	1.290	1	.256	2.123	.579	7.778
SOEtoJV	.807	.896	.813	1	.367	2.242	.388	12.967
FriendlyFTZRegulation	-.065	.768	.007	1	.932	.937	.208	4.219
PublicEPlatform	-.271	.972	.078	1	.780	.763	.114	5.123
Constant	-.257	2.913	.008	1	.930	.774		

a. Variable entered on step 1: politics, diplomatics, Corruption, Terrorism, EconomiesofScale, Competitiveness, LandArea, RawMaterial, ICTfacilities, LogisticsTransport, LabourCost, EnvironmentLaw, ResearchAndDevelopment, MarketSize, MarketOpeness, InflationGDP, ManufacturingSkill, TradeFacility, LoanRegulation, GovernmentReform, CustomPractice, NegativeList, CrossBorderLoan, FreeExchangeRMB, SOEtoJV, FriendlyFTZRegulation, PublicEPlatform.

1 limitations/implications (if applicable):

rate is very low and the respondents are mostly manufacturing companies and companies with their own operating offices in Taiwan. Even many respondents are company with their regional head office based in Taiwan, this research still needs more responses outside the country to enable the research findings to be generalized applicable to other FTZs outside China.

Practical implications (if applicable):

Mainland China government has launched many innovative foreign exchange and monetary policies in the China (Shanghai) Pilot Free Trade Zones (CSPFTZ) to attract the global companies to move into CSPFTZ. However, the respondents of this research perceive both the higher the logistics transport cost and the more the cargoes in the negative list of commodity will significantly decrease their willingness to move into the CSPFTZ. The degree of friendly custom practice has a positive impact on the global companies' willingness to move into the CSPFTZ. These attractiveness sub-indices are similar to those sub-indices used by most of the free trade zones in the 1970s to attract foreign manufacturers. The after-survey interviews with several respondents indicate innovative foreign exchange and monetary policies are usually not fully understood by these interviewees even if these policies might be useful to these interviewees. A good policy is useless in terms of their attractiveness to customers unless the potential customers can fully understand these policies. Thus CSPFTZ should ask their market department to actively approach the potential customers to clarify these foreign exchange and monetary policy.

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IMPACT OF ISL – CONTENTUAL PERSPECTIVE

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Abstract

Purpose of this paper:

International Symposium on Logistics (ISL) is a well-known logistics conference that contributes to the international scientific community's discussion. ISL is one of the oldest conferences in its field the themes addressed by the conference are considered to have an impact to the general scientific discussion especially in the fields of logistics and supply chain management. Although there are some analyses done on the community and literature impact of ISL, the precise impact of ISL in terms of themes and topics is still in its infancy. Therefore, the purpose of this paper is to systematically analyze the themes of the textual context in the conference and how those have developed over the years, and how those relate to the general scientific discussion in logistics.

Design/methodology/approach:

The study utilizes integrative literature review approach to systematically analyze the textual content of the previous ISL proceedings. The chosen approach allows to evaluate and interpret all available research relevant to a particular topic of interest of a discipline. A detailed textual analysis is conducted in order to present the discussed themes over the years. The ISL specific results are compared to a dominant scientific literature indexes, namely Web of Science, to illustrate how ISL aligns to the wider scientific discussion. The bibliometric analysis is done by leveraged capabilities coming with a Cloud-based platform toolkit "NAILS".

Findings:

The main contribution of the paper is in providing a detailed analysis of the ISL content-wise. The results reveal how the conference themes and topics are aligned with the overall global scientific trends. The outcome of the analysis identifies and analyses the advancements and lacks of ISL compared to the global trend in the field.

Value:

The chosen approach allows statistical as well as network overview of results through which the role of the ISL can be analyzed in the larger scientific discussion context. The systematic literature analysis allows to assess and compare the value and topicality of global trends of scientific publishing regarding the field of logistics which can be considered useful for the participants, the organizers as well as for the larger scientific community.

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Section 13: Education and training

POSSIBILITIES AND CHALLENGES IN CONVEYING SUPPLY CHAIN RISK MANAGEMENT SKILLS IN HIGHER EDUCATION INSTITUTIONS

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Abstract

Supply chain risk management gains more and more importance in daily operation of supply chains as well as in educational context. However, so far practical results show that there are some operational problems in addressing supply chain risks. Thus in order to overcome the problem, one aspect would be to look at how SCRM is taught and if the educational offer really addresses the required competence development, or if different educational methods should be used. This paper gives an overview of the needs and the offers and identify some challenges in delivering the right competences.

Introduction

Risk Management (RM) is a topic with increasing interest. Within higher educational institutions (HE) risk management has been taught for several decades within different disciplines like law, finance, medicine and engineering (Sage, 2015; Nissen, 2010). Examples of not appropriate risk management have been reported in several articles, also related to supply chain (Ho et al., 2015) and thus the interest in Supply Chain Risk Management (SCRM) education has intensified (Baalsrud Hauge, 2014).

In order to understand why practitioners face difficulties in SCRM it is necessary to understand if this arises from a gap in the educational offering. In order to answer this, we need to look into what RM competences managers need, and then to identify how SCRM is currently taught. Hence our research aims to address this gap and provide some insight on how the gap between practice and teaching can be reduced. The research question that guided our research was: "Is the teaching methods and offers used for teaching SCRM supporting future managers possibilities to handle unexpected events in the supply chain".

Approach

For the research design, a mixed method approach was used (Teddlie and Tashak-kori, 2006), in combination with action research, involving teachers and students at an early stage. The reason for selecting this approach is that it gives the opportunity to analyse the research questions from different perspectives.

The research methodology involves literature reviews and examination of courses. In order to identify the competences needed for SCRM, a literature review was carried out. Papers included in the review were retrieved from online journal academic libraries with a focus on resilience, supply chain risk management, enterprise risk management, and risk assessment. Also entrepreneurial practice is very important. For this purpose, additional to the literature

review, a web search on relevant news and blog contributions, and speeches on trade fair were carried out.

An important issue in order to reduce the miss-management of supply chain risks, is to make sure that a teacher can use the most efficient way of mediating the required competences. Also this were answered by carrying out a literature review. A third step, was to investigate how SCRM is currently taught. Finally, we looked at how topics related to risk management in supply chains are taught today. Also, a questionnaire (N=56) was used in order to get a view of what practitioners and educators identify as relevant teaching methods. Most of those answering the questionnaires where either lectures or high-level managers. In order to cover middle management and those carrying out the daily work in a collaboration, 10 project managers working in large scale complex projects were interviewed and also asked to complete the questionnaire.

Design/methodology/approach:

To answer the research questions, we have combined a literature review and action based research. The data collection involved an analysis of documents, either received from the universities teaching SCRM or via internet (80+). In a second step, a questionnaire was distributed to professionals as well as with professors in SCRM in order to identify the exact learning needs and preferred learning methods. These two inputs where matched and gaps identified.

Findings:

The identified courses and offers were investigated according to their supply chain risk topics. The intention of the analysis was first to get an overview of the educational landscape in the field, as well as to identify the main foci for teaching and training in this area.

There is a large variety of educational offerings (i.e. courses, workshops, seminars, presentations, etc.) on Supply Chain Management (SCM) and SCRM related courses at universities and vocational training institutions. These range from one-day workshops to complete courses and master degrees. Most of the identified courses on risk management topics in the field of SCM were offered to post graduate students, but in recent years, the number of courses targeting undergraduate students has been increasing. The respondents of the questionnaire expect that future employees should have skills on risk management (89,3%), on how to reduce risks as well as how to identify risks (73,2%). The analysis of course content showed that there are several offers supporting this objective, but the analysis also revealed that most of the offers used classical teaching methods like lecturing instead of methods fostering active participation. Vocational training centres used more experiential learning methods, whereas the universities used classical lecturing as the primary teaching method, or lectures in combination with tutorials. The usage of lectures as main teaching form is a contradiction to the preferences of the teaching method based on the analysis of the questionnaires, since the results of the questionnaire on mediation methods show that on average the respondents are sceptical of the sufficiency of only having theoretical classes (50%), but that they do expect that classes will give the students an understanding of risks in Supply Networks (28,6 %)

Value:

An overview of how SCRM is taught and which methods are used for different purposes can support teachers in adapting their own classes and also support the reuse of existing and available material instead of developing new material. The overview can also support a better collaboration among teachers for SCRM, and support the identification of best practice. Such collaboration will lead to higher quality of SCRM teaching, as well as reducing the barrier of introducing new learning tools, like games or situated learning

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INTEGRATING ENTREPRENEURSHIP INTO SUPPLY CHAIN MANAGEMENT CURRICULUM TO EXPAND STUDENTS' ENTREPRENEURIAL MINDSET

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Abstract

Purpose:

Integrating innovation and entrepreneurship into curriculum is a noticeable trend in America's higher education and producing entrepreneurial graduates is becoming a mission for many institutions. Supply chain management and entrepreneurship classes are usually taught in separate classrooms, and yet the knowledge and skillsets pertinent to these two subjects are inseparable and indispensable when it comes to planning and launching new business ventures. Thus, understanding the intersection of these two subjects and developing effective pedagogical methods are valuable for expanding the respective curriculum and for enhancing students' entrepreneurial perspective. This paper is built on two fundamental principles: (1) students' entrepreneurial mindset (EM) is viewed as an important learning outcome by current higher-education institutions; and (2) the EM framework, defined by Kern Entrepreneurial Education Network (KEEN), is adopted as a basis for measuring students' entrepreneurial behaviour. The major goal of this article is to explore teaching methods and classroom exercises that can integrate some aspects of entrepreneurship into supply chain management curriculum and to share the experiences and lessons learned from my own experiments.

Design/Methodology/Approach:

This conceptual paper is a result of two efforts. The first is a comprehensive literature review of two areas: one is the components of a complete entrepreneurship ecosystem in higher-ed setting and representative university practices; and the other is the three attributes of EM defined by KEEN through three C's: curiosity, connection, and creating values. The second effort is experimental in nature and describes a course project based on a real start-up and several in-class exercises/assignments I have designed and implemented in my undergraduate global logistics class to engage students in active learning while simultaneously strengthening their three EM characteristics.

Findings:

The review results and my experiments are presented and areas for future improvement are discussed, while some initial student feedback is also included. In addition, possible ways for integrating the fundamental elements of supply chain management and entrepreneurship into respective courses are proposed. It is found that active learning is an effective pathway for cultivating students' entrepreneurial mindset.

Value:

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

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MODERATED MEDIATION ANALYSIS OF ACADEMIC IMPACT OF SUPPLY CHAIN MANAGEMENT SCHOLARS

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Abstract

Purpose - This paper applies social capital theory to develop a theoretical model for the antecedents of the research impact of supply chain management scholars.

Methodology - From a database of 450 supply chain management scholars from various universities collected from ResearchGate and economic data from the World Bank. We apply Hayes (2012)'s PROCESS model to test our model by integrating the moderated regression analysis and path analysis to simultaneously analyze moderation and mediation.

Findings - Our research results suggest that social capital theory has a strong explanatory power on the relationship between research skill and academic impact. Further, an examination of the boundary effect of the country level factor suggests that this mechanism is economic development dependent.

Research implications -The ideas and results from researchers with higher social capital skill will be more widespread and accepted. A supply chain management scholar has a higher research impact if he/she works in a country with high economic development.

Practical implications - The results indicate that SCM scholars can enhance their academic impact by increasing their social capital. In addition, a strong correlation between altmetrics and bibliometrics indicates that the researchers who have greater academic impact can usually enjoy better social impact among researchers sharing similar research interests.

Value -This paper seeks to fill the gap in explaining the relationship between research skill and their academic impact. We found that social capital theory can explain the relationship between research skill and academic impact for SCM scholars. Further, the economic development of a country moderated this relationship and the mediation effect of social capital.

Keywords: Academic Impact; Social capital; transportation; Supply chain management; Moderated mediation effect

INVESTIGATING LOGISTICS SKILLS GAPS AND THEIR IMPACT ON THE SUPPLY CHAIN: A REVIEW OF THE SOUTHERN AFRICAN SITUATION

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Abstract

PURPOSE:

Southern Africa relies on trade to generate wealth to fund its economic and social development. Successful trade is dependent upon efficient and effective supply chains that must be supported by sound logistics management. It is therefore important to understand the current levels of skills required to operate those supply chains and deliver serviceability able to capture and sustain global business. This research endeavours to understand the skills required for South African and Namibian supply chains, identify those that are available and thereby recognise any skills gaps. It then seeks to ascertain the impact of any gaps on supply chain development in southern Africa and suggest a route to addressing them.

DESIGN/METHODOLOGY/APPROACH:

This research takes a critical realist approach using purposeful sampling of logistics industry stakeholders from South Africa and Namibia. The main instruments used were surveys evolved from previous research from Heyns and Luke (2013), based in South Africa. The surveys were designed to determine skills requirements and availability in the region, which enabled an understanding of skills gaps and their impact.

FINDINGS:

The investigation determined shortages in the South African and Namibian logistics industries, showing the similarities and differences between the two countries. Comparing the data sets enabled the researchers to understand the possible causes of the differences and make tentative extrapolations concerning the skills situation across southern Africa.

LIMITATIONS:

The main limitations concern the sample size, especially in Namibia, and the fact that the investigation to date has only covered two of the southern African countries, over different time periods. The limitations should be addressed by extending the survey laterally to include a greater number of Namibian stakeholders and encompass neighbouring (SADC) countries such as Botswana and Mozambique. It would also be desirable to extend the study longitudinally to investigate on-going changes and trends.

RESEARCH IMPLICATIONS:

The research output will increase the academic knowledge in this important area by creating awareness of the magnitude of the problem, thus laying the foundation for further academic investigation into the issue. It will also provide important information for government and policy makers to consider in terms of future education and training interventions for the logistics sector.

ORIGINALITY:

Originality is derived from the fact that previous research on skills gaps in southern Africa's developing countries is limited.

DEPLOYING SERIOUS GAMES FOR SUPPLY CHAIN MANAGEMENT: LESSONS LEARNED AND GOOD PRACTICES

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Abstract

Several engineering and business schools offer game based learning either as a supplementary to lecturers or as an integrated part of their curriculum. Most of the games are used in a workshop setting, and much of the learning outcome is achieved through the debriefing part of the workshop, i.e. not as an integrated part of the game. One reason is that many of the games do not offer stealth assessment, and thus need interpretation of a very well skilled facilitator. In additions games only used for one specific course are costly to develop, maintain and improve and in addition facilitated games put limitations on the class size and make it costly to integrate. This article report experience with using a COTS game within a specific curriculum.

Introduction

While there is a certain consensus about the educational potential of SGs in higher education (HE), the deployment rate of SG in HE and their proper insertion in meaningful curricula are still quite low [1]. This is generally attributed to an undefined teacher's reluctance towards the use of games. However, there is also a lack of papers in the literature describing deployment of SGs for HE in detail, critically showing their educational benefits and providing guidelines and practices on their use, in comparison with other educational tools/techniques (e.g., [2,3]).

This article intends to discuss how games can be used in different ways for teaching supply chain management as well as to report on our experience in using managerial SGs at different European universities.

The article reports and discusses the results from a game, SHORTFALL, used in three different courses at different institutions.

SHORTFALL was administered in a digital format where students access the game online. To ascertain the strengths and weaknesses of SHORTFALL as a supplement to classical teaching and purely as a game-based learning, the approach was to:

- Capture or collect usability data, such as scores, task completion time, error records, and subjective ratings;
- Analyse and interpret usability data to identify fitness of purpose;
- Critique and suggest solutions or improvements to mitigate problems.

It analyse the results achieved by the students as well as the experience of the teachers.

Findings:

The findings are based on the analysis of the results from three universities: The results from the two universities that have used serious games for teaching purposes for a long time, indicate that a teacher/facilitator with some experience using SHORTFALL is important and that the regular use of the game by continuous adaption with corresponding taught topics impacts on the students learning outcomes, since we have seen a steadily improvement of the reported learning outcome. The third university has less experience in using Serious Games, but long experience in teaching SCM. A comparison with the results from the third university, which used SHORTFALL for the first time, will help us to answer better to which portion the experience with the teaching method and the experience in teaching the topic (SCM and sustainable production) as well as the setting and integration influences the results. By comparing the results both across the institutions and with the results of previous years, it will be possible to understand better how SHORTFALL can be integrated in the curricula, the challenges and barriers and also how to overcome these.

Results

The article presents the results of three courses at three different universities and with slightly different application area, but all within supply chain management. Two of the institutions teaches engineers, whereas the third teaches business school students.

Value:

Whereas the Polish invitation makes its first experience with GBL, the German and UK institutions can look back to decades of using experiential learning. The report on the teachers experience on what to consider for a successful introduction is valuable for other institution looking into implementing gamebased learning in their curricula.

Research limitations/implications (if applicable):

So far only three universities took part in the experiments, but it is the intention to enlarge this group in order to identify patterns and to provide more general guidelines for integration of SG in the manufacturing education. Such long term measures will also improve the understanding of how different game mechanics influence the gameplay and the learning outcome. It will also help to understand for which learning types, different types of adaption are necessary and to understand how to optimise the setting.

Practical implications (if applicable):

The article gives some directions for what teachers should consider and how to avoid some pitfalls. The comparison of the results and the experience from the universities does not only give insights in the role of the teachers, but also reveals differences in the educational mind-setting in the different countries. This will be valuable information for further work and for teachers being interested in using games for educational purposes.

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SYSTEMATIC LITERATURE REVIEW OF SERIOUS GAMES AND SIMULATIONS ON URBAN TRANSPORT PLANNING

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Abstract

Purpose of this paper:

During the past decades government and local authorities have paid more and more attention to developing new mobility concepts. However, this requires improved simulation of different transport modes like buses, trams, trains, cars, bicycles as well as pedestrian and their interaction. This means that simulation models need to satisfy different requirements in order to serve as good visualization and decision support tools useful for investigating causes of effects such as congestion, accidents, to study the effects of policies and designs to manage and regulate traffic, and to provide insights on urban development and planning [1, 2]. In addition, holistic mobility concepts for urban regions require that different stakeholders get together, interact and collaboratively develop suitable mobility concepts, taking the need and the requirements of each stakeholder group into account. This results in growing needs of simulating large-scale complex traffic patterns, individual behaviour etc. at the scale of large cities, possibly informed by real time sensor data and visualized in real time for decision support [3]. However, many traffic simulations provide highly complex, accurate models with high granularity for one mode, but do often not mirror the complexity and the high interaction and mutual dependencies of the real world needed for an holistic planning. This paper presents the results of a systematic review on existing games and simulation on urban transport planning described in the literature.

Design/methodology/approach:

A structured literature search was carried out according to [4]. The keywords used in finding the literatures are derived from previous research related to serious games and simulations as well as in transport and urban planning fields such as serious games, simulation, simulation games, game-based learning, computer games, online games, teaching, learning, education, curriculum, training, skills, motivation, engagement, transport, traffic, logistics, transport planning, urban planning, multimodal planning, and mobility. The databases used in this work originate from catalogs from a German University and online databases which identified relevant in these fields such as Science Direct, IEEE etc.. To select relevant publications, several criteria are determined for example papers which aim to support learning process in urban planning, traffic and transport studies (engineering and planning), as well as multimodal mobility and published between January 2006 and January 2016 (present).

Findings:

Search terms found that there are 19 papers included in this topic and a brief summary is provided in this paper. The findings detected there are 7 simulations and 20 games, clustered in the four different categories: 1) building a city or transport infrastructures; 2) providing transport services and business; 3) simulating transport and traffic modelling and design [5]; 4) serious games in planning new projects for urban area [6] and dealing with strategic planning process of an organization. The majority of the games use very simplified scenarios

and are single player games. However, we also identified a few with more complex, and thus realistic scenarios that are used for decision support and collaboration, mostly for urban spatial planning.

Value:

The article gives an overview of current simulation and games that are described in the literature and analysis how these can be used for educational purposes. Thereby, it also identifies a gap between existing games and the educational requirements on such games.

Researchers in urban and transport studies will be benefit by from this work as well as lecturers and students in urban and regional planning as well as transport engineering to identify which serious games and simulations will able to support their learning and class.

Research limitations/implications:

There are also some limitation identified, for instance keywords and databases used as well as published year of papers include. Not all papers provide the methodology in developing the games and some of paper provides the information more than one simulations or serious games. Furthermore, a number of existing simulations in urban transport planning could not be included, because no papers related to those simulations in accessed databases.

Practical implications:

This literature review leads to a conclusion that designing a serious game in this area is needed in order to support stakeholders (practitioners) and students who are learning transport engineering and urban planning subjects and could be applied in the university.

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