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(WCOSM 2017)

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Committee of the WCOSM - 2017

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Book of Abstracts of 3rd World Conference on Supply Chain Management (WCOSM 2017)

Edited by Prof. Dr. Alassane B. Ndiaye and Dr. Renuka Herath

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MESSAGE FROM THE CONFERENCE CO-CHAIR WSCOM 2017

Dear Supply Chain Friends, Dear WCOSM Delegates,

The ever increasing connectivity of processes, people and products and the raising concerns about sustainability bring to light critical challenges that supply chains will face in the coming times.

As supplychain generally accounts for between 60% and 90% of all company costs (exclusive of financial services), any challenge it faces will undoubtedly be equally critical to company's performance, to final consumer satisfaction and to the society as a whole.

The future supply chain is expected to provide better benefits for all stakeholders across networks much more complex and interrelated than nowadays.

Supply Chain science must therefore come up with innovative, sustainable, reliable and integrated solutions based on new thinking, new approaches and new collaborations.

We believe that the time is now to address this issue at a quicker pace, to act efficiently and to move forward for the benefit of all.

Organised by The International Institute of Knowledge Management, TIIKM, Sri-Lanka and hosted by Qalinca-Labs, University of Brussels, ULB, Belgium, this World Conference aims at being a forum for presenting and discussing the most recent innovations, best practices, concerns and challenges encountered as well as theoretical and practical solutions to be put forward in selected topics of Supply Chain Management.

Thanks to your valuable contributions, WCOSM shall definitely fulfill its promises to deliver new ideas and strategies for supply chains to perform in an increasingly connected world; the new thinking needed to drive new or well-established supply chains to the next excellence level.

Welcome to WCOSM-2017!
Welcome to Colombo, Sri-Lanka!

Prof. Dr. Alassane Ballé NDIAYE
Professor of Logistics and Transport Systems
Conference Co-Chair

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ORAL PRESENTATIONS



[01]

ENHANCING WORKFORCE PARTICIPATION: KNOWLEDGE AND COMPETENCY MAPPING

S Narayanaswami

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ABSTRACT

Today's global job market is characterized by surplus supply of human capital and huge demands for vacancies. Governments propose reservation policies to marginalized groups to overcome such imbalances. For one particular Gulf country, the vision is to attain a reasonable local employment target by 2030. This talk covers anomalies, policy agenda, need for national education attainment and its impact towards a diversified economy; a statistical research was conducted to explore impacts of education levels and skills on employability using a fairly large population size to understand the discrepancies in employability as supply side analysis. The research objectives were (i) to define and assess competency levels qualitatively as knowledge and skills set, (ii) to identify and evaluate competency gaps quantitatively and (iii) to recommend affirmative actions in specific sectors. We developed a model for employability as a function of a set of well-defined independent variables termed as competency levels. Initial study revealed that higher levels of competency did not significantly influence in accepting a lucrative employment offer. Consequently data was reclassified and dependent variable was redefined as a dichotomous workforce participation, to include both entrepreneurial and employable data points. Using logistic regression, we estimated the dependent variable and a probability of occurrence factor of each independent variable as an odds ratio. Methodical analysis led to ascertain specific competency levels that had a higher significance on employability and sectors of employment that fit those competencies. Insights are drawn on dependency modeling, review and analyses of research outcomes and recommendations for affirmative actions.

[02]

A SIMULATION OF THE SOCIAL VALUE OF A COMMUNITY-BASED SOCIAL ENTERPRISE USING VALUE CHAIN ANALYSIS

G Navarro and M Palangeo

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ABSTRACT

Through a case study of a cooperative, the researchers simulated how community-based social enterprise creates social value by measuring the positive returns of its existence to the society as a solution to unequal distribution of income and rural unemployment originating from farm-based entrepreneurs. Community-based enterprise is a social enterprise which needs to multiply because it provides social benefits for the society like labor creation for indigenous peoples in countryside areas. Likewise, extending the value chain of SEs generate additional employment for a greater social benefit. Nonetheless, the free market failed to deliver such economic advantage as evidenced by undersupply of private SEs in the Philippines. Moreover, SE products are not at par with mainstream supermarkets adversely affecting indigenous laborers due to weak market demand. These markets were uninformed on the social benefits it tends to contribute to the society each time they buy from a SE. Such market failures can be conciliated through the creation of intra-value chain within the SE. With this pioneering study in one coffee region in the Philippines, the Keynes multiplier simulated the impact of per peso invested on additional chain of operation. The relevance of an institutional enterprise was also emphasized. This research concluded that the creation of additional value chain focused on providing consumer's value for their money through intra-trading of products in the countryside, instead of inter-trading, provides the consumer an authentic experience of contributing to an SE which can boost a better long-term consequence.

Keywords: Social Enterprise, Community-Based Enterprise, Value Chain, Market Failure

[03]

USING AUTOMATION TECHNOLOGY AND IOT BASED DATA CAPTURING TO ENSURE HIGH QUALITY LAST MILE

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ABSTRACT

The field executive (FE) for any company is not just a service or delivery personnel but is the customer facing brand ambassador. A positive demeanour inspires trust and respect for the person and the company tag he / she carries. Moreover, attendance is a basic capability for any business to keep record of its employees and manage its manpower and financial resources. In the following paper, we present various sense-&-respond concepts and technologies that can be used to track and, in-turn, enhance the performance of individual last mile resources. Sense-&-respond systems can lead to well-defined action plan enabling an efficient Last Mile (LM) service, thus improving customer experience, curtailing unnecessary costs and improving safety of all stakeholders. The different modular and customizable solutions conceptualized and evaluated below include multiple IOT platforms, like BLE beacons, GPS, recorders, and camera based solutions, that can be employed to have a multi-point sensing in Last mile delivery service. We cover aspects, ranging from attendance, FE's disposition, track and trace, and route optimization, customer and FE behavior and a feedback mechanism to allow for continuous improvement of customer and FE experience.

Keywords: Last Mile, Field Executive, IOT, Sense-&-Respond

[04]

**OPTIMAL ELECTIVE SURGERY SCHEDULING SUBJECT TO DISRUPTIONS BY
EMERGENT CASES**

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³Macquarie University, China

ABSTRACT

This paper addresses the scheduling of elective surgeries in an operation theater that has to treat emergent patients with priority when they arrive (randomly). The number of the patients for elective surgeries is fixed, all waiting at time zero for operations. The problem is to find the optimal policy to determine the sequence of all operations in waiting. Optimal policies are derived based on the theory and techniques of stochastic scheduling and open bandit processes.

Keywords Surgery Scheduling; Open Bandit Processes; Gittins Index

[05]

**APPLICABILITY OF MAKE-TO-ORDER VS MAKE-TO-STOCK PRODUCTION
STRATEGIES FOR DEMAND MANAGEMENT: A CASE STUDY FROM A
FORKLIFT WHEEL MANUFACTURING INDUSTRY**

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ABSTRACT

The manufacturers are one of the most important contributors in a supply chain. Inventory plays a paramount role in the increase of the service level of customer orders as well as finished goods inventory replenishment management concept reduces lead time-time to fill order demand .In an, Industrial forklift wheels business process, application of Make-to-Order (MTO) vs Make-to-Stock (MTS) inventory management concepts is crucial for the wheels manufacturing and inventory management process. This research focuses on forklift wheels manufacture where they struggled to balance service level vs inventory. Through a thorough literature review on different domains and different industries the authors came up with a mechanism to switch the product MTO to MTS. This study evaluates and implements the new strategy for the forklift wheels business and analyzes how to classify each product to each manufacturing strategy. Then states the appropriate inventory levels, upper control level, lower control level and the reorder points. The study yields that the proposed strategy directly gives an impact on increasing delivery performance to increase service level of customer orders. This research contributes to literature, especially for wheel, tire and tube manufacturing to set-up parameters for inventory calculation and product strategy to determine the correct blend of MTO to MTS. Furthermore, the proposed strategy can be easily expanded into other manufacturing industries.

Keywords: Inventory Management, Manufacturing Strategies

[06]

STRENGTHENING SUPPLY CHAIN RESILIENCE THROUGH SME BUSINESS CONTINUITY MANAGEMENT

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ABSTRACT

From the point of view of business continuity risks, the country's experience with Typhoon Haiyan and other major calamities showed how disruptions in business activities impact the ability of local economies to recover. While large companies typically have a business continuity plan in place, Small and Medium Enterprises (SMEs)—which usually form part of their supply chain, do not. Consequently, disrupted operations of the SMEs affect the operations and markets of large companies—resulting to the impaired ability of the business sector to resume operations. This contributes to the slow recovery of local economic activities in disaster-stricken areas. An efficient and effective business continuity program should be applicable to any enterprise—more importantly to SMEs given their importance in local economic development and their criticality given the risks they face from not having a plan for business recovery and survival in place. Recognizing the need for an ecosystem to support the institutionalization and promotion of supply chain resiliency that will contribute to local economic development, the Department of Trade and Industry, the Philippine Chamber of Commerce and Industry, the Philippine Exporters Confederation, Inc., and the Philippine Disaster Resilience Foundation proposed an initiative for a “Public-Private Partnership on Building SME Resilience”. This initiative intends to engage key actors in the fields of SME development, disaster risk reduction and management, climate change adaptation, and business continuity management in order to facilitate the development and implementation of policies, strategies and activities that will build the capacity of SMEs towards supply chain resiliency.

Keywords: Supply Chain, Resiliency, Business Continuity, Disaster, SMEs, Economic

[07]

CHALLENGES AND OPPORTUNITIES IN COMPUTING LOGISTICS COST IN E-COMMERCE SUPPLY CHAIN

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ABSTRACT

Revenue generation by a logistics company depends on how the logistics cost of a shipment is calculated. Logistics cost of a shipment is a function of distance & speed of the shipment travel in a network, its volumetric and dead weight. Logistics billing is based mainly on the consumption of the scarce resource (space or weight carrying capacity of a carrier). Shipment's size or deadweight is a function of product and packaging weight, dimensions and flexibility. Hence, to arrive at a standard methodology to compute accurate cost to bill the customer, the interplay among above mentioned physical attributes along with their measurement plays key role. This becomes even more complex for an ecommerce company, like Flipkart, which caters to shipments from both warehouse and marketplace in an unorganized non-standard market like India. In this paper, we'll explore ways to define a standard way of billing the non-standard shipments across wide range of size, shape and deadweight. These ways are, to use the numerical factor based on historical data of 1.2 million shipments and to use the real/contour volume from the optoelectrical systems used to calculate volume, instead of conventional method of using bounding box volume for all the shipments. We will conclude the paper with a summary to provide solutions to the non-standard industry of e-commerce to use better way to calculate shipping cost based on volumetric weight.

Keywords: Logistics Cost, Volumetric Weight, Deadweight, Contour Volume

[08]

MULTI OBJECTIVE SUPPLY CHAIN NETWORK RECONFIGURATION UNDER DISRUPTIONSV Rajagopal¹, S. P Venkatesan² and R Agrawal³^{1,2,3} *Dept. of Production Engg, National Institute of Technology, Tiruchirapalli, India***ABSTRACT**

Disruption in today's complex and global supply chain network (SCN) results in a huge negative impact on business performance. Companies try to manage disruptions by shifting the production/sourcing to undisrupted facilities, expanding the capacity at selected facilities, rerouting transportation and outsourcing the unmet demands. Models and methods to find a cost effective SCN reconfiguration to deal with disruption need attention. In this work a multi-objective SCN reconfiguration in a dynamic planning horizon under facility disruptions is modelled using p-robust mixed integer linear programming. Facility disruption scenarios are generated using Monte Carlo simulation. The augmented ϵ -constraint method is proposed as a solution approach to obtain a set of Pareto optimal solutions of minimised network cost and delivery time. Numerical illustration is presented and our results report that capacity expansion at undisrupted facilities and outsourcing unmet demands are preferred only in scenarios where more than one simultaneous facility disruptions occur. Further, only specific facilities which serve more number of customers at nominal condition are expanded under disruption recovery window. The trade-off generated between the reconfiguration cost and the maximum relative regret shows that substantial robustness against disruption can be achieved with minimal increase in network cost.

Keywords: Supply Chain Network Reconfiguration, Facility Disruption, Capacity Expansion, P-Robust, Multi-Objective, Multi-Period

[09]

THE IMPACT OF GREEN SUPPLY CHAIN MANAGEMENT (GSCM) PRACTICES ON ORGANIZATIONAL PERFORMANCE

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ABSTRACT

The purpose of this study was to examine the impact of Green Supply Chain Management (GSCM) practices on organizational performance. The study was conducted in 150 manufacturing companies in Sri Lanka, particularly examining the impact of implementing a set of Green Supply Chain Management practices: eco-design, green purchasing, environmental corporation, and reverse logistics on different dimensions of the organizational performance: operational, environmental, economic, and social performances. GSCM practices and dimensions of organizational performance were found through a comprehensive survey of literature and the research model was formed through these practices and performance dimensions. Also, the model incorporated three control variables: the size of the firm, firm age and environment management system certifications. The study followed the quantitative research approach. An e-mail based questionnaire survey was conducted to collect the primary data for the study. Reliability and validity of the research model were tested with commonly accepted statistical tools. To test the hypotheses related to GSCM practices and organizational performance, the multiple regression analysis was used. The results of the study showed that there was an impact of GSCM practices on overall performance of the organization. Further the study found that, most of Sri Lankan manufacturing organizations still possess a little understanding on the concept of GSCM. But some firms who demonstrate a world class performance have a sound understanding on the concept and are practicing it with a GSCM policy. However, the generalizability of these findings is limited, since the study concerned only 150 manufacturing companies in Sri Lanka. In the Sri Lankan context researches on GSCM is still in the emerging stage. Encouraging researching in this context will be more beneficial to make popular the concept in both manufacturing and service sector in Sri Lanka.

Keywords: Green Supply Chain Management, Organizational Performance, Eco-design, Green Purchasing, Environmental Corporation, Reverse Logistics

[10]

**ANALYSING SUITABLE SUPPLY CHAIN ACTIVITIES FOR THE COST
EFFICIENCY OF HOTEL INDUSTRY IN SRI LANKA**

A. M. R Begam

Management and Science University, Malaysia

ABSTRACT

Hotel industry as a whole is starting to awaken the activities of value of supply chain for the quality of service and cost reduction aspects. Utility of Supply chain management in the hotel industry is necessary in organizing activities to achieve the target. Nowadays service providing organizations were started focusing on supply chain. After the approximate 30 years of civil war in the country the hotel industry in Sri Lanka is booming of recording 160% of increase in tourists' arrival in mid of 2016 when comparing to 2011. Better financial performance may boost the foreign direct investment and reinvestment to the industry to serve the increasing demand for the hotel rooms in the country. Suitable cost controlling activities may increase the profit per room. The recent analysis of the growth in hospitality industry in Sri Lanka reveals that the average operational profit per room in hotels are continue to decrease though the room occupancy and revenue are high.

This research focuses on identifying the suitable activities of supply chain which helpful in reducing the operational cost while maintaining the service quality. The sample size selected for the study will be 20 managers responsible for Supply chain activities working in the higher, middle and lower levels of management from randomly selected hotels in Sri Lanka. Comparative analysis of the supply chain management of hotel industry of other tourist attraction in Asia is used for the qualitative analysis.

Keywords: Supply Chain, Average Profit Per Room, Reinvestment, Operational Cost, Revenue, Service Quality

[11]

GREEN SUPPLY CHAIN MANAGEMENT PRACTICES: A LITERATURE REVIEW

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ABSTRACT

Green Supply Chain Management (GSCM) has become to known as a key approach to enhance the environmental sustainability. GSCM has also been receiving the spotlight in many studies. In this era, preserving the natural environment has become very challenging so that business organizations have started to increase the awareness level of environmental protection by the society. This paper therefore is intended to provide a critical evaluation of literature review on Green Supply Chain Management (GSCM) practices. A rigorous literature review was carried in order to critically evaluate the definitions and different green supply chain management practices discussed by many authors. Articles reviewed for the purpose of this paper were chosen carefully to maintain the trustworthiness of the paper. Both conceptual and empirical papers published during last ten years in the reputed and indexed high impact factor journals were chosen to review. Then a content analysis was carried out comparing and contrasting the theories presented and discussed in the chosen articles published on green management practices.

Findings suggested that Green Procurement, Green Design and Manufacturing, Green Distribution and Reverse Logistics are the prominent Green Management Practices highlighted in the reviewed literature although they have been presented in many different aspects.

Keywords : Green Supply Chain Management Practices, Content Analysis, Green Procurement, Green Design and Manufacturing, Green Distribution, Reverse Logistics

[12]

**LOGISTICS COLLABORATION SOLUTIONS TO IMPROVE SHORT FOOD
SUPPLY CHAIN SOLUTION PERFORMANCE**A Nsamzinshuti¹; M Janjevic², N Rigo³ and A. B Ndiaye⁴

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Belgium*

ABSTRACT

In recent years, new forms of consumption alternative to conventional food systems have emerged across the world. These consumption patterns advocate consumption of local products, quality and the distribution with maximum one intermediary between the producer and the consumer or ideally nil. The objective of these consumption patterns, which is distributed through short food supply chain, is to reduce the externalities caused by conventional consumption modes. Many authors have shown, through analysis of case studies that the consumption of local products is not reducing automatically the negative externalities. The short food supply chain still faces many challenges in order to constitute a real alternative to the globalized food model. Among these challenges, the logistics is currently the main bottleneck for the development of this sector. The logistics become even more complex when it occurs in urban areas.

The objective of this paper is to understand the specificities and the constraints of the short food supply chain in order to design suitable logistic solutions to improve short food supply chain performance.

Keywords: Local Food System, Short Food System, Performance

[13]

LEAD-TIME DISTURBANCE AND UNCERTAINTY ON PRODUCTION AND INVENTORY CONTROL: A REVIEW

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ABSTRACT

The main goal of supply chain managers is to match customer demand with supply effectively, in order to minimise stockout rate as well as to reduce operating costs. Uncertainties and disturbances in the lead-time can lead to supply chain inefficiencies and risks. Notwithstanding the relevance of lead-time changes, previous research has focused on understanding the impact of demand uncertainty and on improving demand forecasting methods. In this paper, we review the body of knowledge in relation to the impact of lead-time disturbance and uncertainty on the planning and control of production and inventory systems. Articles are classified according to the applied methodology, performance criteria, type of mathematical model (linear/nonlinear, discrete/continuous, deterministic/stochastic) and venues for future research are outlined. We found a number of articles using analytical modelling techniques to investigate the impact of stochastic lead-time on supply chain performance. However, there is lack of understanding on the impact of deterministic disturbances triggered, for instance, by known sudden changes in lead-time. The literature recognises the importance of estimating lead-time with accuracy since a mismatch between actual and estimated lead-times may lead to an inventory drift, but it fails to capture the underlying mechanisms of lead-time disturbances, which are fundamental for an effective system design.

Keywords: Lead-Time, Disturbance, Uncertainty, Production and Inventory Control Models

[14]

SUPPLIER COLLABORATION FOR NEW PRODUCT DEVELOPMENTS Ahmed¹ and A. J Alam²

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ABSTRACT

It is recognized that new product development (NPD) is a highly interdependent process requiring contribution from various parties internal as well as external to the organization. The external parties are the suppliers and customers. While some firms involve the customers many others involve the suppliers in the NPD efforts. Research suggests that collaboration with suppliers go a long way to reduce costs, time to market, improve the quality and design of product, and finally a smooth launch of the product. Automobile industry is characterized by constant innovation, cost cutting, improved quality, and less time to market for newly developed products. The pace of change in product innovation is enormous and firm has to constantly reinvent itself to remain in competition for profitability and survival. This paper analyses supplier's role in Indian automobile industry in new product development. The paper is case based and highlights the best practices adopted by the Japanese counterpart. India, being an emerging market, is different from other developed markets. It has its own unique characteristics. The paper focuses on supplier collaboration issues and the challenges faced by the automobile sector in India.

Keywords: New Product Development, Automobile, Supplier Collaboration

[15]

EVOLUTION OF UNITIZATION IN E-COMMERCE SUPPLY CHAINR Pitale¹, P Arora², Pankhuri³ and D Malkan⁴*^{1,2,3,4} Flipkart Pvt Ltd, India***ABSTRACT**

Unitization as a way of moving bulk shipments is known to save on multiple fronts like time, space, costs, manpower and damages in any supply chain. This study talks about evolution of unitization in one of India's largest supply chain entity, which faces multiple unique challenges and is largely based on unorganized and fragmented partners. We also highlight the challenges faced while designing a standardized unit for a wide range of shipments, with non-standard packaging being transported across various facilities and in non-standard vehicles. Taking learning from the retail industry, roll containers stand out as the best alternative for replacing bags as a unit. Arriving at the most suitable form factor of the roll container involved studying the entire range of vehicles and hub-spaces which the units are to occupy. Designing a cost-effective process for circulating the units across locations is done through integration with the existing lanes. Capitalizing on the versatility of an end-to-end e-commerce supply chain, a step-by-step or a crawl-walk-run approach is proposed to build confidence in the roll containers for unitization. As suggested earlier, the benefits are expected on multiple fronts, namely improving speed, quality and safety while reducing the costs of logistics across the chain.

Keywords: Unitization, Roll Containers, E-commerce, Bulk Movement

VIRTUAL PRESENTATIONS

[16]

**SUPPLY RISK MITIGATION OF SME THROUGH LEVERAGING SOCIAL
CAPITAL: DEVELOPMENT AND VALIDATION OF A MEASUREMENT
INSTRUMENT**

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ABSTRACT

Literature on supply risk management has consistently promoted the use of network capital to mitigate supply risk of Small and Medium Enterprises (SMEs). Many scholars in supply chain management have suggested that structural, relational and cognitive dimensions of social capital in both the buyer–supplier network and the network of peers within a cluster can play an influential role in mitigating the supply risk of SMEs. Although research interest in supply risk management through a social capital approach is growing, so far no study has been directed towards the development of an instrument to measure network capital in the context of SMEs. To supplement such inadequacy, this study conceptualizes, develops and validates four constructs of network resources/practices, namely, buyer–supplier social capital, cluster social capital, buyer–supplier integration and cluster cooperation, that assist in mitigating supply risk of SMEs. Then, it proposes an instrument to measure these constructs. In developing the instrument, a rigorous process employing literature review, focus groups discussion, opinions of academics and experts, and agreement survey has been followed. Using the survey data collected from the apparel SMEs of Bangladesh for validation, the findings of the study suggest that the proposed instrument is a set of reliable and valid measures of the above mentioned constructs. Therefore, it can be subsequently applied in other context through a contextual modification as a means to examine various theoretical and conceptual models.

Keywords: Measurement, Social Capital, Supply Risk, Small and Medium Enterprises

[17]

A SIMULATION-BASED STUDY TO ASSESS THE EFFECTS OF INVENTORY POLICIES FOR WINERY SUPPLY CHAINS (WSCs)

D. C. L. De Zoysa¹ and T. D Rupasinghe²

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ABSTRACT

Winery Supply Chains (WSCs) are more cash sensitive as a considerable portion of inventory is kept and financed throughout the WSC due to the long production process, distances from suppliers/markets and the importance of having the correct finished goods for orders. Hence, Inventory Optimization (IO) is one of the most critical areas in a WSC. This paper is framed on a comparison of three main types of inventory policies, the continuous review, the periodic review policy and a hybrid of both policies, analyzing their impact on selected Key Performance Indicators (KPI) referring to the cost and the customer satisfaction level. The developed simulation models incorporating the comparison, integrates demand specific for wine products to a distributor in a Winery Supply Chain. This paper measures the effects of periodic and continuous review policies for the KPIs and introduces a hybrid inventory policy integrating the characteristics of periodic and continuous review policies as well. As a result, the simulated models would enable the wine distributor manage the trade-offs of each inventory policy.

Keywords: Inventory Policies, Safety Stock, Simulation, Winery Supply Chains

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**AN ANALYTICAL MODELLING APPROACH TO ASSESS THE APPLICABILITY
OF GREEN CHAIN OPERATIONS: A CASE STUDY FROM THE SRI LANKAN
APPAREL INDUSTRY**

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ABSTRACT

Adopting ‘green’ practices synonyms with achieving long-term sustainability and many companies attempt to add value by adding “green” practices to their supply chains. However, manufacturers and suppliers are often hesitant on adopting green supply chain practices owing to the fear of incurring huge initial investments. To address the above issues, companies need a performance measurement framework to evaluate the applicability of Green Supply Chain Management (GSCM) practices in their industry domains. The Sri Lankan apparel industry is on the verge of embracing the GSCM practices into their supply chain processes. The objective of this study is to provide a framework to evaluate the applicability of GSCM practices in the Sri Lankan apparel industry from the operations management standpoint. Applicability is measured using performance measurement tools such as Balance Scorecard and Analytical Hierarchical Process (AHP) analysis. The proposed framework maps the key performance indicators hand-in-hand balancing economic performance and GSCM practices. Data collection was carried out from leading apparel manufacturers in Sri Lanka and the outcomes of this research helps determine the applicability of GSCM practices for Sri Lanka to yield economical, sustainable, and environmental benefits.

Keywords: Analytical Hierarchical Process, Apparel Industry, Balance Scorecard, Green, Supply Chain Management

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**SIMULATION BASED MODEL FOR ASSESSING THE BEHAVIOUR OF RETAIL
SUPPLY CHAIN NETWORKS**I. U Munasinghe¹ and T. D Rupasinghe²

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ABSTRACT

The study focuses on developing a simulation-based model to permits the evaluation of operating performance prior to the implementation of a Supply Chain Network Design (SCND) for retail supply chain. It enables companies to perform powerful what-if analyses leading them to make better informed decisions. The study helps companies evaluate the right number, location and necessary capacities of distribution centres (DCs) and warehousing facilities based on future projected demand and service level targets. This allows the decision makers to see the performance of the supply chain over time under various scenarios and help them understand the inter-relationships between different model components. The authors have carried out performance evaluation under various scenarios to enhance the applicability of the SCND by different locations and different combinations of the allocation of facilities to products. The ultimate objectives of the work was to minimizing of total supply chain network design cost including variable cost and maximize organization's customer service potential and provides comprehensive study of the firm's supply chain structure and performance through the various scenarios.

Keywords: Multi-Echelon, Retail Distribution, Simulation, Supply Chain Management, Supply Chain Network Design, Supply Chain Network Performance

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IMPLEMENTATION OF SIX SIGMA TOOLS TO IMPROVE SUPPLY CHAIN EFFICIENCY OF AN ELECTRONIC GOODS MANUFACTURING INDUSTRY

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ABSTRACT

Increase in competencies in global markets enforce the organizations to reduce their total cost structure, increase quality, efficiency, and production capability without increasing capital investment for topline growth. To achieve continuous growth and success in today's market nearly every business process needs improvement. Organizations must rely on effective supply chains, or networks, to compete and grow in the global market and networked economy. The optimal supply chain strategy plays an operational role in achieving economic, social and ecological performance. Due to the advancement in the cost reduction strategies, industries are concentrating on their supply chain management to achieve the optimality between the supply and demand. Many tools and methodologies are being devised to develop differentiated purchasing strategies. This case study explores the clubbed behavior of Six Sigma, DMAIC and Lean tools to prioritize the suppliers. The study also focuses on implementation of Six Sigma tools, and techniques in supply chain for an electronic device manufacturing firm based in Pune to improve its Key Performance Indices (KPIs). In addition, this methodology aids in physical inventory accuracy as well as reduce the lead time between on time delivery of shipments. The advantages of implementation of suggested solutions are that it will reduce total operational cost, improve supply chain efficiency, and rise in level of customer satisfaction.

Keywords: DMAIC, OTS, Lean System, Six Sigma, Supply Chain Management

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**OPTIMAL SORTATION STRATEGY FOR A DISTRIBUTION NETWORK IN AN
E-COMMERCE SUPPLY CHAIN**Pankhuri¹, C Singh², P Krothapalli³ and K Karthik⁴*^{1,2,3,4} Flipkart Internet Pvt. Ltd, India***ABSTRACT**

The backbone of any retail e-commerce success story is a unique design of supply chain network, providing the business an unparalleled speed and scalability. Primary goal of the supply chain strategy is to meet customer expectation by offering fastest deliveries, while keeping the cost minimal. Meeting this objective at the large market that India provides is the problem statement that we have targeted here. There are many models and optimization techniques focused on network design to identify the ideal facility location and size, optimizing cost and speed. In this paper we are presenting a tactical approach to optimize cost of an existing network for a predefined speed. We have considered both forward and reverse logistics of a retail e-commerce supply chain consisting of multiple fulfilment (warehouse) and delivery centers, which are connected via sortation nodes. The mathematical model presented here determines if the shipment from a node should get sorted directly for the last mile delivery center or it should travel as consolidated package to another node for further sortation (resort). The objective function minimizes the total cost by varying the resort percentages between nodes and provides the optimal resource allocation and number of sorts at each node.

Keywords: Distribution Strategy, Mathematical Model, Network Design

