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# Management Science, Logistics, and Operations Research



John Wang



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John Wang  
*Montclair State University, USA*

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# Preface

## INTRODUCTION

Globalization, competition, and increasingly sophisticated and informed customers are creating greater challenges for today's businesses. While achieving supply chain excellence in the face of these challenges is becoming more difficult, organizations that lead in supply chain improvement may be able to develop and maintain competitive advantages. The aim of Supply Chain Management is to produce, distribute, and deliver goods and services at the right location, right time, and right amount to satisfy customers, with minimum time and cost wastes. Technological innovations and applications bring new values to logistics and supply chain management. Newly developed technologies and techniques have substantially facilitated companies to achieve their goals to reduce costs, improve service, adding more values to their customers. New technologies, such as Geographical Information Systems (GIS) and Radio Frequency Identification (RFID), have changed traditional logistics and supply chain operations. In particular, RFID has emerged as part of a new type of inter-organizational intelligent system that aims to improve the efficiency of supply chains. It has become a new and exciting area of technological development, and is receiving increasing amounts of attention from both academicians and practitioners.

Green Supply Chain Management (GSCM) is an approach that targets at the overall optimization of material and information flows along the value chain. The main aspect is a stronger focus on ecological and sociological aspects when making organizational decisions. A related concept is corporate sustainability. Sustainability offers companies more opportunities to save costs, increase efficiency, and win new customers and suppliers. Even further, it incorporates the potential to gain a competitive advantage and to generate more profits by employing a variety of new practices and techniques such as reuse, recycle, reengineering. A common way to evaluate sustainability is through the lens of the Triple Bottom Line (3BL), which defines as: a) social responsibility, b) environmental stewardship, and c) economic viability. These pillars are sometimes termed "People, Planet, Profits." Social responsibility deals with such concerns as whether the firm provides a safe working environment. Environmental stewardship addresses how can a firm avoid depleting resources, prevent pollution, or otherwise reduce its ecological footprint. Economic viability concerns whether the firm is profitable, and can it be expected to grow and prosper, providing returns to investors? A firm that is deficient in any of these three facets is ultimately not sustainable. A company focusing on this triple bottom line through sustainability needs to investigate and apply changes to all upstream and downstream parties of its supply chain, as well as external stakeholders. This challenge includes questions at both strategic and operational levels that should be highlighted in its supply chain strategy.

In today's ever-growing competitive environment, effective supply chain management is progressively dependent on Third-Party Logistics (3PL) companies' functioning. Advancement in information technologies has brought all-encompassing values to Third-Party Logistics (3PL) companies. More often than not, three parties including the producer, the distributor, and the third-party logistics provider are involved in the supply chain. The occurrence of the 3PL provider in the entire supply chain has a noteworthy impact on its performance (Gotzamani, Longinidis, & Vouzas, 2010; Cai, et al., 2013). In order to stay competitive, all companies must identify the specific area(s) with high potential value, optimize their restricted resources, and enhance the most value to the whole supply chain, a value-added chain. E-procurement plays an ever-increasing role.

The purpose of this study is to explore some important issues in supply chain operations and discuss their applications, benefits, challenges, as well as future directions, providing some foundations for further discussions and research.

## **RFID INVENTORY CONTROL**

Radio Frequency Identification (RFID) has become a hot topic and application in manufacturing and logistics industries for over a decade. RFID has emerged as part of a new pattern of inter-organizational intelligent system that targets to improve the efficiency of the processes in supply chains. It has become a new and exciting area of technological development, and is receiving increasing amounts of attention from both academicians and practitioners. Of the many organizations having implemented RFID technology, the one that received the most media attention is the retailing giant Wal-Mart. Wal-Mart has arguably one of the most efficient supply chains in the world, which include large selections of suppliers from many different industries, countries, and regions. Wal-Mart's RFID effort has the potential to cause a large wave of RFID implementations in many fields, ranging from manufacturing, packaging, to logistics and distribution. Wal-Mart's own estimated savings would reach \$8.35 billion per year if it fully implemented RFID throughout its operations. Though this savings is quite substantial, Wal-Mart has taken its RFID implementation fairly slowly.

Wal-Mart and its suppliers quickly found several challenges in its RFID implementation – the UHF frequency they were using as a standard would not pass through many common products shipped to retail stores, such as water-based products and items shipped in metal packaging. Due to such challenges, by 2005, the top 100 suppliers had only tagged about 60 percent of their products. The development of RFID, such as the momentum provided by Wal-Mart along with the US Defense Department, and some European companies such as Tesco, has caused companies to take a hard look at what RFID can do for them and whether they should give further consideration to adopting the technology.

RFID plays a key role in bridging the information gaps among originations and is used to build up an "Internet of things" – a network that would allow companies to track goods through the global supply chain and run many applications simultaneously (Violino, 2005). Thonemann (2002) reports that after the deployment of RFID technologies, Procter & Gamble and Wal-Mart simultaneously reduced inventory levels by 70%, improved service levels from 96% to 99%. They also reduced administration costs by re-engineering their supply chains.

According to the market research firm IDTechEx (Das, 2005), the sales of RFID tags for the 60 years up to the beginning of 2006 reached 2.4 billion, with 600 million tags being sold in 2005 alone. It was expected that 1.3 billion tags and 500 million RFID smart labels would be needed in a range of areas,

including retailing, logistics, animals and farming, library services, and military equipment. Similarly, Bagchi et al. (2007) forecast the prediction of RFID growth as from \$1 billion in 2003 to \$4 billion in 2008 to \$20 billion in 2013. Though not without issues and challenges, RFID is a promising technology which analysts expect to become ubiquitous in the coming years, facilitating organizations to solve problems in supply chain management, security, personal identification, and asset tracking.

Along with the rapid development of RFID applications, RFID is an exciting area for research due to its relative novelty and exploding growth. RFID research has led to the emergence of a new academic research area that builds on existing research in an array of disciplines, including engineering, information systems, computer science, operations research, and business strategy, and there has been a significant increase in the number of papers on RFID in research journals, especially on the subject of production and inventory control.

Gunasekaran and Ngai (2005) highlight RFID technology as one of the important information technologies for Build-to-Order Supply Chain (BOSC) that increases enterprises efficiency and accuracy in production and inventory management. Similarly, Nemeth et al. (2006) present a review on RFID systems and the challenges and possibilities of the integration to supply chains. Chao et al. (2007) provide a review of the literature on trends and forecast of RFID technologies by a historical review method and bibliometric analysis. They focus on the RFID innovation, deployment by enterprises and market diffusion in supply chain management.

Inaccuracy issues in inventory management are important in supply chain management. Kang and Gershwin (2004) argue that although many organizations have automated their inventory control using information systems, inventory levels in information systems and the real physical inventory levels often do not match. Dehoratius and Raman (2008) report that 65% of the inventory records in retail stores were inaccurate. The result was obtained through a case study, by examining about 370,000 inventory records from 37 stores of a chain retailer. Delaunay et al. (2007) conduct a survey on the causes of inventory inaccuracy problems in supply chain management. Dolgui and Proth (2008) also present a literature review on RFID technology in supply chain. They focused on the advantages of this technology in inventory management. They analyze some problems and present ideas dealing with privacy this technology to supply chains is not only in increasing the efficiency of systems but also in supporting the reorganization of the systems that become more efficient.

The causes of inventory inaccuracy can be roughly categorized into four groups: transaction errors, shrinkage errors, inaccessible inventory, and supply errors. Iglehart and Morey (1972) first introduced transaction errors in inventory management. Transaction errors include shipment errors, delivery errors, scanning errors and also incorrect identification of items (Lee, Cheng, & Leung, 2005). Shrinkage errors (also named stock loss) include all types of errors that cause loss of products ready for sale. Hollinger and Davis (2001) report that shrinkage errors represent 1.69% of sales for retailers. Shrinkage errors include employee theft, shoplifting, administration and paperwork errors, vendor fraud and unavailable products for sale. Decrease shrinkage levels, increase profits.

Inaccessible inventory can be defined as products that are not in the correct place and are not available for customers. Inaccessible inventories have been studied widely. Raman et al. (2001) identify that misplaced items could reduce profits by 25%. Product quality, yield efficiency, and supply process can all affect inventory accuracy (Rekik, et al., 2007). RFID technologies provide better product traceability through its real time data capture abilities that enable improvements in the supply chains against these inventory inaccuracy issues. Although RFID cannot eliminate all errors, they can be detected quickly and they can be dealt with effectively. Zipkin (2006) shows that RFID is in particular very successful to eliminate transaction errors.

Replenishment policies are very important decisions for determining the size and timing of orders to lower ordering, holding and stock-out costs. There are several inventory policies available under continuous or periodic review inventory systems. Inventory replenishment decisions are made based on inventory levels in the information system. RFID technologies provide real-time inventory information and ensure the accuracy of inventory levels. The effects of RFID technologies on replenishment policies have been studied by Kok and Shang (2007), Lee et al. (2005), and Kang and Gershwin (2004) among others.

Inventory control could also benefit from RFID to improve inventory visibility through decrease shrinkage levels, increase profits. Customer service and the shopping experience can be enhanced by providing complementary applications enabled by RFID by manufacturer or supplier. Stock out cases can be decreased by increased inventory visibility. Decreased stock outs increase sales and ultimately, increase profits.

## **SUSTAINABLE SUPPLY CHAIN MANAGEMENT**

Sustainable business models have received increasing attention from business practitioners and academic researchers in recent years. The growing importance of sustainable supply chain management is driven largely by the escalating deterioration of the environment, diminishing natural resources, expanded legislation, intensified global competition, and value-seeking initiatives. Sustainable supply chain management, green movement, along with reverse logistics, have their roots in both supply chain management and environmental literature. Adding the sustainability component to supply chain management involves addressing the influence and relationships between traditional supply chain management and the sustainable environment. Murphy et al. (1995) conducted a survey of more than 100 corporate executives and revealed that 60% of the group considered sustainability to be highly important and 82% expected that its importance would further increase in the years to come.

On the other hand, research and practice on sustainable supply chains have a relatively short history and issues at both the strategic and tactical levels are largely untouched. As sound reverse logistics networks serves as the foundation for efficient and effective sustainable supply chains where industrial ecology, profitability, and substantiality are primary concerns, a better understanding of the current situation of research on such topics is needed. Fundamentals of sustainable supply chain management as a competitive initiative are explained by Porter and van der Linde (1995), which argue that investments in sustainability lead to resource saving, waste eliminating, and productivity improving. As a consequence, sustainable supply chain management assists to lower the environmental impact of a firm, enhance its business efficiency, and possibly create major competitive advantages through operations and innovations.

CSCMP states logistics involves "the management of the flow of goods, services, and related information between the point of origin and the point of consumption, in order to meet customer requirements." Logistics deals with the movement and storage functions of the supply chain. The energy used in transport and in controlled climate storage is substantial. In particular, energy consumption across the US will increase by 1.5% annually in the commercial sector and 0.5% in the industrial sector. Between 1996 and 2006, the price of energy in the US more than doubled. This makes energy costs in the commercial industry have an average increase of close to 10% per year, which creates a substantial burden on most companies.



Sustainable supply chain management covers a variety of business activities, such as sustainable design, including product design for environmental compatibility and recovery, Environmental Conscious Design (ECD), and Life Cycle Assessment (LCA); sustainable operations, including green engineering, network design for reverse flow, green/sustainable manufacturing (e.g. production planning and scheduling, inventory management), and waste management (e.g. resource reduction and disposal). The commitment follows a “top-down” approach and requires both cross-functional (individual company) and cross-organizational (supply chain partners) collaboration.

While increased attention has been paid on sustainable supply chain management by industrial practitioners, it has also become a fast-growing topic in academic research. Kopicki et al. (1993) present three management approaches for managing sustainable supply chains: reactive, proactive, and value-seeking. In the reactive approach, to achieve sustainability, companies comply with environmental regulations by committing minimal resources. They start to procure goods with some recycled contents and use filters to lower the environmental impact of production. In the second approach, companies tend to expand the resources devoted to sustainable management. Recycling, reuse, and sustainable design are conducted by the firms to pre-empt new environmental regulations. Value-seeking is the most far reaching approach, where companies actively integrate sustainable activities into a business strategy and operate to reduce the impact on the environment as a strategic initiative.

Quantitative methods have been extensively applied in the research to improve sustainability in supply chains mathematical programming, such as Linear Programming (LP) and Mixed Integer Programming (MIP), is first widely used for modeling production lot sizing and routing problems in reverse logistics systems. A stream of research is particular focusing on the integrated production, inventory, and distribution problems with reverse flows. Del Castillo and Cochran (1996) study a production and distribution problem for products delivered in reusable containers. The model is defined for a two-stage network with a forward flow from a plant to a depot and a reverse flow of empty containers back to the plant. A hierarchical solution approach is proposed, where LP models are designed to determine the master production-distribution plan. Chen et al. (2007) explore a container vessel scheduling problem with bidirectional flows between a single origin and a single destination, where the forward flow sends customer orders packed in cargo containers from the origin port to the destination port, while the reverse flow brings empty containers back to the origin. The problem is solved through a linear program and a greedy heuristic method. Lei et al. (2009) study an integrated production and distribution problem motivated by the practice of a medical equipment leasing and service network that supplies, repairs, inventories, and distributes both new and refurbished medical devices to business customers. A partial LP relaxation-based heuristic approach is proposed to solve the problem.

Remanufacturing and inventory control are important areas. Inderfurth et al. (2001) develop a periodic review model for studying product recovery in stochastic remanufacturing systems with multiple reuse options. Mahadeven et al. (2003) focus on a product recovery and production-inventory control model. A remanufacturing facility that receives a stream of returned products according to a Poisson process is analyzed. Several heuristics based on traditional inventory models are proposed. Takahashi et al. (2007) consider a remanufacturing system with reproduction and disposal. Two control policies are provided and Markov analysis is used to evaluate the performance. Product take-back systems are analyzed in Klausner and Hendrickson (2000). An alternative take-back system would combine profitable remanufacturing and unprofitable materials recycling. A model that allows determining the optimal amount to spend on buy-back and the optimal unit cost of reverse logistics is established, which can be used to select a suitable reverse logistics system for EOL products.

Listes and Dekker (2005) present a stochastic programming based approach by which a deterministic location model for product recovery network design may be extended to explicitly account for the uncertainties. Stochastic models are used to understand a representative real case study on recycling sand. Recently, El-Sayed et al. (2010) develop a multi-period, multi-echelon, forward-reverse logistics network design under risk model. The network structure consists of three echelons in the forward direction (suppliers, facilities, and distribution centers) and two echelons in the reverse direction (disassembly and redistribution centers), with stochastic demands. The problem is formulated in a Stochastic Mixed Integer Linear Programming (SMILP) decision making form as a multi-stage stochastic program.

A variety of issues are addressed in the research on reverse logistics and sustainable supply chain management with more attention given to green operations. Both quantitative and qualitative approaches are used, where research concerned with strategic issues are conducted by using qualitative methods such as case study and conceptual descriptions, and tactical and operational decisions are analyzed by using quantitative techniques such as linear programming and stochastic programming. It can be observed that there has been a trend to use mathematical models to analyze green supply chain problems in recent years.

### THIRD-PARTY LOGISTICS (OUTBOUND LOGISTICS)

Using *Agency Theory*, Whipple and Roh (2010) assess the likelihood of quality fade in buyer-supplier relationships and prescribe contractual mechanisms for reducing quality fade. A 2×2 matrix is proposed that contrasts outcome measurability with outcome uncertainty to illustrate buyer and supplier vulnerability (quality fade) and to suggest contractual mechanisms that can be used to mitigate vulnerability for both parties. A case of zero-inventory production-distribution systems under pool-point delivery has been studied by Geismar, Dawande, and Sriskandarajah (2011). Including multiple trucks, a modifiable production rate, and alternative objectives, the authors develop intuition into this case. Combining theoretical analysis and computational experiments, they gain insights into optimizing the total cost of a production-delivery plan by understanding the trade-off between production and transportation.

In order to increase customer loyalty, Jiang, Wang, and Ding (2013) bring disruption management idea into Vehicle Routing Problem (VRP) and present a delivery service priority method. Both a single- and a multi-vehicle delivery delay disruption management recovery models with service priority are constructed to ensure all the key customers' service level with distribution delay. They used an improved Genetic algorithm to solve the problem. Applying traditional Multiple Attribute Decision-Making (MADM) for selecting 3PL providers has many shortcomings, especially for NP-complete problems. Based on Fuzzy Analytic Network Process (FANP) and Preemptive Fuzzy Integer Goal Programming (PFIGP), Wong (2012) propose a Decision Support System (DSS) for a critical issue of selecting logistics outsourcing providers under the trends of globalization. The model takes into consideration flexible resource and interactions among providers. After obtaining experts' scores of the providers, the author integrates the scores into PFIGP solves it via genetic algorithms.

From a provider's perspective, Large, Kramer, and Hartmann (2011) investigate the potential impact of customer-specific adaptations by Third-Party Logistics (3PL) providers on the success of 3PL-relationships. Based on research in 3PL, relationship marketing and transaction cost theory, the authors present a document analysis, develop and test hypotheses with structural equation modelling and causal analysis with partial least square. Their study provides evidence that customer-specific adaptation by providers is an important prerequisite to 3PL-performance. Building upon the basic notions of service

theory, competence research and the resource based view, Prockl, Pflaum, and Kotzab (2012) develop a general frame of reference addressing the value proposition and the value creation architecture that leads to generic business model configurations for contract logistics services. Combining the dimensions of integration power and intangible knowledge creation, the authors specify generic types of contract logistics services. From the service provider's point of view, the authors deliver a set of distinct business models for 3PL services reflecting the customer's and address specific aspects of the generation/production of required services.

Supposing that logistics capabilities play a mediating role, Evangelista, Mogre, Perego, Raspagliesi, and Sweeney (2012) explore the relationship between IT and 3PLs' performance. Based on a questionnaire survey, the authors test a conceptual Resource-Based View (RBV) framework linking IT adoption, logistics capabilities and firm performance with factor analysis and Ordinary Least Square (OLS) regression analysis. Multidisciplinary approach combining management of information systems, strategy, logistics and supply chain management have been used. Rajesh, Pugazhendhi, and Ganesh (2011) devise a four-stage model for the development of a Generic Taxonomy Components Framework (GTCF) to implement Knowledge Management (KM) solution for 3PL service providers. The main components of the four-stage model are modified Q-sort method and Delphi analysis. The authors identified KM components and derived the hierarchical structure of the taxonomy. Using a novel neighborhood rough set approach, Bai and Sarkis (2013) introduce a performance evaluation of third party reverse logistics providers model and evaluate its robustness with various factors.

Reverse Logistics (RL) has attained more importance among practitioners and academicians due to growing environmental legislations recently. Govindan and Murugesan (2011) use fuzzy extent analysis to solve a Third-Party Reverse Logistics Provider (3PRLP) selection problem. The authors found that for a company to manage outbound logistics (Accenture supply chain management practice) takes 1/12 as many steps to process returns as it maintains the separate RL system. It stimulates many companies to outsource the RL activities or functions through 3PRLPs. As a highly multi-faceted methodology, fuzzy extent analysis requires more numerical calculations. Using structural equation modelling from a survey, Juga, Juntunen, and Grant (2010) investigate how perceived service quality influences both a shipper's satisfaction and subsequent loyalty in 3PL outsourcing relationships. The authors identified critical service dimensions and their impact on satisfaction and loyalty. A theoretical model is in turn examined empirically. Logistics service providers recognize the importance of service quality in outsourcing relationships.

Zhong and Zhou (2011) investigate the application of GPS-based information technologies to optimize operations of companies providing 3PL service. The authors discuss how these technologies help to enhance the effective and efficient management of their businesses and analyze the interaction of GPS implementation and several key characteristics of the logistic distribution context. Hingley, Lindgreen, Grant, and Kane (2011) investigate benefits of and barriers to the use of Fourth-Party Logistics (4PL) management as a catalyst for horizontal collaboration. The authors show that barriers to such integration are created by power plays among lead stakeholders in grocery retailing that inhibit horizontal collaboration. However, Sheffi (2012) noticed the problem of unemployment among less educated and less trained workers.

Trappey et al. (2010) apply a two-stage clustering approach combined with Ward's minimum-variance method and the K-means algorithm and help the logistics companies to prioritize their services to better satisfy groups of customers with specific preferences. The authors model logistic services as customizable services and develop a data system methodology to define the profiles of automobile manufacturers and

their preferred logistic services. Drawing on types of third party collections of returned products, Qian, Han, Da, and Stokes (2012) propose a 0-1 mixed integrate linear programming (0-1MILP) model for reverse logistics networks in e-business and determine the market demands and returns. Facing returned products from e-business customers, the authors identify possibilities for the application of the reverse logistics network models. Lin and Pekkarinen (2011) develop a framework of QFD (Quality Function Deployment)-based logistics service design to integrate the HOQ (House of Quality) technique and modular logic to help in designing logistics services with high quality and a large service variety.

## **E-PROCUREMENT SYSTEM/OUTSOURCING**

In line with Barahona and Elizondo (2012), due to its characteristics, size, and impact, e-procurement has a strategic importance not only for public administration but for e-government, since its implementation necessarily crosses many institutional barriers and paradigms of many public managers. However, the realization of these savings requires user compliance. Using survey data, Brandon-Jones and Carey (2011) examine the extent to which user-perceived E-Procurement Quality (EPQ) influences both system and contract compliance and found a strong positive relationship between user-perceived EPQ and both system and contract compliance. Practitioners should focus on managing different dimensions of perceived quality as they may have totally different effects on both contract and system compliance. Also, Kersten, Vahidov, and Gimón (2013) notice that concession-making behavior is an essential process in negotiations and auctions and has critical impact on the outcomes of an exchange since it may achieve Pareto-optimal agreements.

According to McCue and Roman (2012), worldwide governments seem to identify and peddle technology as a way to transform how they govern. Public procurement is at the forefront of most reform efforts since it plays a significant role in promoting accountability and transparency. The authors found that digitalized public procurement has not yet led to significant transformative changes due to the many obstacles, such as unsuitability of software platforms, organizational resistance, lack of strategic systems' integration and failure to involve public procurement professionals in the design of e-procurement systems, etc. In order to capitalize on the potentially transformative nature of ICT in procurement, decision makers must take an active role in both the design of the software and its adoption process dealing with political, institutional and behavioral domains. Starting to discuss the evolution of e-procurement systems within the chemical industry as a whole, Taube and Bryant (2010) examine the use of Electronic Procurement within the Supply Chain Management systems of industrial firms. The authors found that both administrative acquisition costs and total purchase cost for all components, basic ingredients, and raw materials are cut down.

Rather than working on the macro-level impact of e-government on citizens' trust in government, Smith (2010) provides a deeper understanding of the complexity of the interaction between e-services and citizens' trust in government. A comparative case study of two e-services was conducted. The author presents an integrated conception of trust, institutional trust, and a comparative analysis of citizens' perceptions and interpretations of "successful" e-services. Griffiths and Payab (2010) examine many issues and solutions to the implementation of e-procurement systems within supply chains. The authors place these challenges into five categories: lack of standardisation, integration of e-commerce-driven transactions with other systems, immaturity of e-procurement-based services, security fears and end-user resistance and maverick purchasing. Also, the authors offer some solutions to these challenges, such as providing

appropriate infrastructure for e-procurement, effective supplier and contract management, the control of end-user behaviour in e-procurement activities and product differentiation and strategic alliances.

Quesada, González, Mueller, and Mueller (2010) examine the impact of electronic procurement technologies on Procurement Practices (PPR) and Procurement Performance (PP). A model of the relationships between E-Procurement Technology (EPT) usage, PPR, and PP was proposed, tested and validated. By providing an empirical test of the impact of EPTs on perceptions of PPR and performance, the authors' contribution is obvious. Hong, Dobrzykowski, and Vonderembse (2010) examine the use of specific supply chain Information Technologies (IT) for e-commerce, e-procurement, and Enterprise Resource Planning (ERP), when implementing lean practices to achieve Mass Customization (MC) performance with different focuses. After collecting data via survey, the authors utilize exploratory factor analysis, hierarchical multiple regression, and T-tests to analyze relationships between lean practices, IT use, and MC performance in aggregated and bifurcated samples of product and service focused manufacturers. The authors confirm that e-commerce use is a better predictor of performance than e-procurement or ERP for service focused manufacturers. Best practices related to lean practices, e-commerce, e-procurement, and ERP emerge among high MC performers. This paper is the first study to examine these three IT approaches in the context of lean practices and supply chain MC performance.

Azadegan and Teich (2010) develop propositions on the adoption of electronic data interchange and online auctions, two distinct types of E-Procurement Technologies (EPT). The authors highlight three prominent adoption theories explaining innovation adoption and show how benchmarking of innovation adoptions and EPT can be made more effective by applying a multi-dimensional perspective. Accounting for the economic planning and development of a nation, E-procurements are the major activities in G2B. Cloud computing provides the most possible solutions to the emerged transformations. Wang (2012) try to catch the current e-procurement flow and its bottlenecks if any. The author explore the necessary services and display an architecture of publice-procurement under the cloud. García et al. (2013) propose a new suppliers' evaluation-and-selection model based on a FDSS (Fuzzy Decision Support System). The proposed method is robust enough to improve the main shortcomings of more simplistic methods.

## CONCLUSION

Globalization, competition, and increasingly sophisticated and informed customers are creating greater supply chain challenges for today's businesses. While achieving supply chain excellence in the face of these challenges is difficult, companies that lead in supply chain improvement may be able to build competitive advantages. Our study provides information on the current use of RFID technology in supply chain operations and its impacts on supply chain management systems. RFIDs have demonstrated tremendous opportunities for increasing value, reduce inventory costs, eliminate stock errors, and allow companies to update their logistics and inventory databases. As RFID technology can provide important business benefits, the results of this research deliver a better understanding of current problems and issues in RFID technology introduction and show which factors influence the level of success.

We also address the important issue of sustainable supply chain management. With a substantial large number of variables and constraints, the challenges with which we are dealing in sustainable supply chain systems are much more complicated than those in traditional settings. The inherent complexity of environmental issues poses serious challenges to business managers and researchers. There are certainly rewards for being an environmentally responsive company. Not only should the positive effect on a

company's image be taken into consideration, there are also long-term benefits to a company's financial bottom-line. The primary needs from today's businesses are not tactical or operational in nature. In fact, they tend to be strategic and unstructured in general with more requirements in the areas of intra- and inter-firm collaboration and diffusion of best practices. Many changes in policies, practices, concepts, and technologies can be expected in the years to come, which can bring fresh opportunities for meaningful academic research in sustainable supply chain management.

For gaining competitive advantage, companies need to enhance value chain velocity, intensify customer service, and decrease total logistics costs, including consolidation, transportation and inventory carrying costs. Inbound and outbound logistics consists of many multi-party processes. Managing orders, appointments and shipments follows the data exchange on multiple networks. Certainly, the removal of the barriers between inbound and outbound operations is the first step for moving to a demand-driven value network.

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