PAPER • OPEN ACCESS

Operations Research for Supply chain management – An Overview of Issue and Contributions

To cite this article: S Amulu Priya *et al* 2021 *J. Phys.: Conf. Ser.* **1964** 022010

Operations Research for Supply chain management – An Overview of Issue and Contributions

S Amulu Priya[1], V Maheswari[2*] and V.Balaji[3]
[1]Department of Mathematics Vels Institute of Science, Technology & Advanced Studies, Chennai - 600117, Tamilnadu, India.
[2]Department of Mathematics, Vels Institute of Science, Technology & Advanced Studies Chennai – 600117, Tamilnadu, India.
[3]Department of Mathematics, Sacred Heart College, Tirupatur – 635601, Tamilnadu, India.

E-mail: maheswari.sbs@velsuniv.ac.in

Abstract. The Logistics and Production Network Administration agrees that this is a mandatory research area, although there are some written reviews and examinations on this field. Operations research, which is also known as 'Science of Better' deals with mathematical models in order to take better decisions with better alternative options. A review of chronological progresses in Supply Chain Management (SCM)and SC modeling is offered to provide an insight into the development and possibilities of SCM modeling. This article is set out to suggest some serious issues in SCM research by means of several reviews related to the policy of Operations Administration. This paper focuses on the reviewing of various mathematical models proposed and suggested for SCM and SC operations. The article intends to study and analyze journals, books and articles published from the most known and comprehensive international journal on operations management and logistics. The purpose of this work is to identify trends in the literature and identify strategic results, financial strictures, limitations and related issues in strategic planning and model chain design. Finally, certain guidelines and recommendations are provided for supporting future work in this area.
Keywords: Supply chain (SC), Supply Chain Management (SCM)
2010 AMS Subject Classification : 90B06

1. Introduction

Supply chain (SC) is a mechanism that concerns the preparation, arrangement, and management of products, parts, and finished goods from supplier to consumer. SC also deals with the flow of materials and knowledge collection within the company. [1] Management of the supply chain (SCM) is the management and amalgamation of all of these undertakings to gain a sustainable competitive edge. SCM, however, addresses a broad variety of strategic, technical, and financial concerns.

The role of the Operations Research (OR) model in operational SCM is relevant as SCM becomes a new discipline. The emphasis has been on the architecture, efficiency, and research of SCs since 1985. One of the most pervasive competitive challenges that today seems to pose a great challenge to managers is improving overall SC performance. [2] proposed 23 types of models for SCM logistics operations and strongly argued that OR/MS technology was required to help logistics process consolidation and change. They suggested, however, that these various models must be organized successfully to model the multi-stage SC correctly. Therefore, the key aim of this paper is to reflect on a variety of new and recent documents that have increased the current level of activity in SC science.

2. Supply Chain Management Concept

The development in logistics theory and experience has contributed to the emergence in the late 20th century of a novel logistics concept - SCM, which is now the most aggressively integrated commercial and economic field ever. There is an impartial basis for the growth of SCM: the ever growing customer's role, the globalizing of markets and has known for gaining greater attention.[3],[4]. There are many fields that have helped in the expansion of literature in SCM, like procurement and supply, operations management, logistics and transport, marketing, management information systems, organizational theory and also the strategic management [5]. Following the practice of the most productive companies in the influential sectors, strategic management growth can be evaluated across 4 conditional stages [6].

In the early 1970s, before the development of the theory of analytical levels, the main concept of effective strategies was marketing and logistics planning and construction. The formation of the scientific discipline in the 1980s was a key notion of effective strategies. In the late 1980s - 1990s, the main idea of self-improvement and effective strategies was the concept of resources. Better capabilities, network strengthening, and additional forms of inter-company collaboration have benefited from the growth of a lively philosophy of strategic management since the 2000s. Maybe the definition of SCM would be generated qualitatively. To date, analysts and specialists have been focusing on creating a framework for incorporating core business operations and organizing the chain's organizations. [7] has been highly influenced by the idea of strategic planning and competitive advantage, and has also recommended that only one of the major strategies should be used for better control. The supply chain and value structure suggested by [7] is critical to SCM's understanding of how businesses build internal systems (value chains) and activities with dealers, networks, and consumers outside the business to deliver the value level provided by the consumer (value system).

Table 1. Definition of SCM concept

Reference nos	Definition
[8]	"SCM means the handling of goods and services such as transportation, flow, storage, shelf life, analysis of purchased goods and logistics sold. SCM helps to plan and execute specific SC operations. To create a company's net worth, determine the current market trend for demand and supply of any goods or services and synchronize the same to measure the company's performance."
[9]	"SCM is stated as the amalgamation of crucial business processes from customers into core traders who offer value-added goods, services and material to consumers and other shareholders".
[10]	**"**SCM is the integration of organizational units into the SC and the coordination of material, info and monetary flows to meet the demands of consumer to increase overall SC competitiveness".
[11]	"The SC is an organizational system of individuals, undertakings, information and funds that are involved in transferring of goods and services from dealers or sellers to consumers. SC operations are the conversion of natural resources and raw materials into the final product distributed to the end users. A large business network that produces value through products and services delivered to the end user, by means of several upstream and downstream contacts and relations, across numerous procedures and activities".
[12]	"SCM is recognized as the incorporation of business processes from end users to core suppliers who deliver data to add value to goods and customers. SCM has developed to be a source of competitive advantage for firms across different industries".

[13]	"SCM covers the planning and management of every action involved in obtaining and procurement, exchange and every logistics management activities. Prominently, it is known for being involved in organization and association with network partners who may be dealers, mediators, third party service providers and clienteles. In short, SC assimilates management of demand and supply within organizations and even across the organisations."
[14]	"The process of scheduling, executing and regulating SC operations with the aim of satisfying consumer needs as competently as possible. SCM deals with every actions and stocks of raw materials, inventory at work, and prepares goods from point-of-source to point-of-use."

SCM is such a vast topic and so many researchers and scholars tend to give definitions and statements according to their own personal experiences [15]. Academics and scholars found that there was a huge variation in defining and implementing SCM [16].

3. The Process of Literature Review

Systematic literature review analyzes and recapitulates preceding researches, comprising of many trends and issues [17]. A organized and complete review of current literature is significant for identifying possible gaps and prospects for forthcoming research [18]. This article follows [17] the procedure for a systematic Literature review:

- Finding related research studies and works;
- elucidation and explanation of those works; and
- Synthesis of crucial findings along with trends and gaps.

Additional recent literature reviews on SC modeling [19] and [20]. This paper tries to complement all reviews by incorporating model evolutions in order to define:

- the manufacturer and distributor who prefers to supply raw materials;
- the number, site, and volume of industrial plants and depositories;
- exact conveyance channels and ways for movement of goods between facilities;
- quantities of raw material and end-item production and swapping processes for movements between traders, factories, shops, and customers; and
- Plans at each of the different sites for the storage of raw materials, transitional items, and final inventory of merchandise.

Operational decisions in the SC, often constrained by decisions taken in the strategic design process, including the determination of short-term delivery and logistical flows at each point between locations and output preparation and inventory management policies. These choices involve deciding the quantity and timing of inventory transfers to consumers and buyers from manufacturers to factories, across plants and warehouses. Production and logistics operations planners must create comprehensive production sequencing and inventory distribution schedules at a more detailed level. We categorize the literature we discuss into two large categories:

Assessing the short-term distribution and logistical movements at locations between manufacturing, planning, and inventory management phases, SC through decisions taken during the strategic design phase is also constrained. The quantity and timing of material movements from manufacturers to factories, through plants and warehouses, and to retailers and customers are decided by these decisions. Product and logistics operations planners should develop comprehensive product sequencing and product distribution programs at a more detailed level. The literature to be analyzed is divided into two key models:

- strategic SC design models;
- production and logistics coordination and control models;

4. Operational decisions applied to SCM

Increased competitions throughout the world have resulted in forcing several firms to be best in all the fields they focus on. Today, there is no much meaning for firm developing and holding a patent for a product if it results in exceeding cost when SC is concerned. Thus, any product or service that is patented needs to be well-designed and well-maintained in order to avoid replacements and loss [21], [22].Amongst the SCM challenges, most important issue is the bullwhip effect that could be stated as increasing demand diversity as the SC moves upwards. These variations decrease the SC effect, decrease service levels and rise costs [23], [24].

This concept was first reported in 1958 by Forester, the forerunner of discussions in the literature for 6eras [25],[26], but not the Bullwhip effect (BWE) or Forrester effect; not conceived until 1997[27]. Note that the Forrester effect is more closely related to the processing of the so-called demand signal in the previous extension of demand [28]. This is often considered the "first law of SC dynamics"[24], too. Many studies have focused on this effect, and its results [29]-[33]. BWE is concerned with the uncertainty that an organization faces when carrying out its operations, giving regard only to the details found in its (ERP) programs in the SC [34].

One of the main causes of disability in SCM is considered to be this. BWE has detrimental effects such as high investment in storage along with the SC, decreasing customer service, loss of revenue due to scarcity, and decreased efficiency of capital investment in other insufficiencies [35], and up to 30 percent profit on industrial losses [29]. BWE literature reviews [34] and [36] from 53 articles on automotive industrial supplies between 1997 and 2011 and 13-axis analytics such as SC structure and storage control to examine the conditions of BWE in the fruitful part of the chain including model and described simulation-based demand effect, forecast type, time delay, and data sharing.

[37] related to an 80-page monograph based on scientific proof of BWE's impact and triggers in main markets, lead time in the production of demand signals, and organizational influences. The costs associated with BWE and approach choices with various degrees of collaboration between regions are also discussed. This research extended previous surveys by using further variations of the SCC that were multifaceted. In particular, the SCC leads to the elimination of ambiguity [24],[26],[29] and related losses [38] and adds to the enhancement of performance [39] in the SC. Furthermore, it also helps in reducing BWE [40].

Numerous articles have recently been conducted on this subject owing to the significance of SCC. [40] gave a study of the role of behavioral influences such as trust and teamwork in SCM and how BWE can be supported by those factors. [39] is moving forward in recognizing the definition of SCC, which considers driving forces and barriers. [41] Compared dissimilar SC inventory structures to evaluate IT, the standard of appraisal, and responsibility for decisions. They also concentrated on simulation studies of vendor-operated inventory (VMI) by analyzing 13 papers. However, since estimation or inventory management approaches are used, they do not pay attention to organizational decisions. The aim of this report, contrary to previous assessments, is to provide a survey of the organizational viewpoint and how a separate partnership strategy has been applied in its association with BWE. As a reference for researchers involved in reproducing the SCC, the purpose of the proposed state-of-the-art is to help.

It may also be mentioned that the current study is intended to address questions such as: What is the most widely used evaluation/inventory management technology for each cooperative system? What are the principal findings of scientific research? Are the projections easily used to differ and list control models? What were the forms of SC systems examined? Overall, this analysis emphasizes realistic considerations that tend to catch the researchers' efforts in applying SCC schemes. To lead the future study, key gaps and patterns were also identified. Study these SCC variants to express the work [42], [43]. Besides, this research follows a systematic literature review strategy, as in the aforementioned reviews [19].

5. Strategic Design Models

The development of the OR model in the wider area of SC design is summarised in this section. The location of the facility and the strategies that assign consumers significant long-term competitive considerations to these facilities are first analyzed. These models aim to monitor SC's architecture, which offers the best service and better cost-efficiency. That is, the central planner manages the whole framework layout in these techniques.

The first full model for the SC design of Hunt-Wesson foods is given by Distribution System Design [44]. They are designing a bender-based decomposition algorithm that solves the problem of multi-code development and delivery system architecture effectively. The scheme has limitations on the number of plants (with defined and secure capacity), the competitiveness of the distribution center, and exchange zones. By taking into account fixed and variable costs for operating warehouses, in addition, to complete manufacturing and shipping costs, the model finds the best distribution center layout. [45] Describes the global model of plant position and constructs the nonlinear programming model for the most part. The objective function captures the transition between the perceived benefit gain and the profit differential that the risk avoidance effect amplifies.

The model includes plant capacity barriers, consumer demand, and economic venture restrictions. This framework discusses the impact of stock values, world interest rates, exchange rate fluctuations, charges for production and transportation, import bills, and taxation on ships. [46] For the implementation of the Global Resource Deployment Strategy, a single-term, non-linear programming model was illustrated. This provided a strong starting point for the development of an effusively interconnected model of the logistics chain by uniting several particular random submodels. The objective function is to raise the overall tax gain in every nation for manufacturing facilities and dispersal centers. Submodels include the output of facilities, limitations of capacity, absence of specifications for plant machinery, absence of inventory balancing at both plant and delivery centers, limitations of demand and supply capacity, and business necessities.

The model specifies the fulfillment center allocation for goods and sub-centers, plants, distribution center suppliers, and business areas. This likewise regulates the components, sub-assemblies and final product size that each plant will produce and by what means these goods will be shipped between vendors, production facilities and distribution centers [47]. [44] expanded this model to take into account the design of multi-volume distribution systems with vehicle routing and transport decisions. It has been combined with [44] and [48]. The position and number of the warehouses are specified by the key problem in their algorithm. Sub-issues specify the best set of vehicle lanes, based on the warehouse layout identified by the master problem (including the number and size of vehicles used in the location). [46] based their previous work on the creation of a decisive model for the architecture of wide delivery networks. Before and after-tax incentives, this model also contains offset exchange conditions and goals. While they provide the global SC design dilemma with a systematic formulation, they do not provide a thorough approach to determine the optimum configuration.

6. Location-Routing Models

The location-routing model will briefly be outlined in this section. In the 1970s, there was a lot of attention on beginning this research field, so we shed light on some real change. [21] And[49] provided a comprehensive description of the versions. This is important because standard models of facility position only represent consumer allocation budgets (e.g.[50]), and the importance of considering integrated space has been explicitly revealed by various researchers. The first job of taking such a single view presumably came from R. Webb, 1968[51], which unilaterally defines depot positions and reflects the impact of using linear distance definitively with vehicle capacity limitations as an alternative to a route distance. The paper concluded that a substantial reduction of precision would arise from the use of straight-line patterns.

In practice after 1980, SK Jacobsen and O.B.G. Madsen used innovative heuristic methods to address the issue of developing a two-tier newspaper delivery system. Where there are no vehicle capacity limits, [52] and [53] have provided correct integer programming approaches to location-route problems. To solve a series of problems that occur at random, as well as add sub-type obstacles, they used a branch and bound algorithm [54]. To solve various depot routing problems with cost and efficiency, depot outputs use an optimization-based heuristic approach. Initially, the heuristics opened all the depots and addressed the question of routing for all. To determine which depots are available and to attract successor customers for open facilities, they use fixed cost and depot capability considerations. [55] deliberates on the effect of environmental and organizational considerations on the problem solving of location-route problems. These variables include the ratio of spatial allocation and position costs of customers to routing costs. In order to assess the impact of particular variables on heuristic efficiency, the writers used a variety of mixtures of well-known routing and position statistics.

7. Material Flows and Inventory Placement

Next, we will discuss more than a few documents that control material flow and inventory positioning effectively in the[56] deskjet printers of Hewlett-Packard provided a random design to bring about material flow in a SC. Each site was presumed to meet random demand and to use a periodic order-to-inventory scheme to decide a pre-determined market target operation or base-stock level (per location). Their architecture is a function of the process of transmission of demand (through which a site converts the demand into orders from its suppliers) and of the process of transmission of supply, which defines the availability of products in place of the seller. For each commodity category and location, they conclude an analysis cycle and order volume and deal with trade-offs between inventory expenditure and service levels in the multi-stage SC. [57] In an integrated three-wheeler production-distribution system, a random model for managing material flow is created.

Different goods, a single processing capacity, a warehouse, and alone trader are part of the scheme. The retailer provides its customers with the lowest quality of operation and lowers total costs during continuous setup and manufacturing at the model factory. While the delivery time from the manufacturer to the trader is constant, if the stock of factory-finished products does not meet the demand of the merchant, there is an option to receiving a fast shipment to the retailer. The model handles random manufacturing time and travels between the factory and its final product stores on a daily basis and distributes the key inventory and service time necessary to represent the overall cost of inventory.

For each product, economic repeat intervals and filling batch sizes are included in the model production. [58] discusses the finished product, the handling principles of FIFO (first, first-out), the multi-stage pull-type assembly mechanism with buffer in-between, and Poisson demand. Each phase follows an approach to (R, R) inventory (when inventory requirements are smaller than R, orders up to R) and a backorder when the inventory is insufficient to satisfy demand.

They start an iteration process that independently considers the currents as a function of strategy parameters in each two-node subsystem. This method stops until all subsystems' average performance values are approx. For each buffer, the output includes the inventory level and backorder potential. P. If the authors do not surpass P 0.3, appropriate findings are given by their approximation method. [59] Explores the position(s) of defense stocks in a multi-stage SC. They refer to a network of SC as and presume that each move follows a base-stock strategy (one step refers to a processing function such as the collection of raw materials, component production, assembly, testing, etc.). By implementing it successfully in Eastman Kodak's digital camera SC, he verified his concept.

8. Conclusion

This paper discusses works and studies that have suggested different mathematical models for SC architecture. As per the above-mentioned concerns, the course of future research would be towards SC model creation that takes advantage of a benefit chain in which several strategic options, monetary considerations, and what is important to the context are feasible. A global SC model that takes into account the elements necessary to offer a full and detailed description of the framework has several study opportunities to create. Novel research areas include:

- models for understanding the influence of vast stochastic elements;
- international economic issues accounting for fluctuations in exchange rate as well as the risks;
- integrating and exhibiting thorough BOM relations;
- product differentiation and mass customization plans;
- capitalizing on advances in information technologies; and
- The assessment of significant strategic international alliances.

In this paper, many applications and the creation of OR models have been listed. Despite these developments, it is proven that common heuristic methods are still used by the most common feasible software packages, causing substantial sub-parametric results. Logistics administrators have picked the most simple and simplified-based tools primarily for SC design and research because of the spread of desktop computers and software bundles with sophisticated GUIs.

9. References

[1] Stevens GC 1989 Integrating the supply chain. Internat J Physical Distribution and Materials Management 19: pp 3–8

[2] Slats PA, Bhola B, Evers JM and Dijkhuizen G 1995 Logistic chain modeling. Europ J Oper Res 87: pp 1–20 64

[3] La Londe B J 1998 Supply Chain Evolution by the numbers. Supply Chain Review 2(1), pp 7-8

[4] Feng Q, Lai G and Lu L X 2015 Dynamic bargaining in a supply chain with asymmetric demand information. *Management Science*, **61(2)**, pp 301-315

[5] Chen I J and Paulraj A 2004 Towards a theory of supply chain management: The constructs and measurements. *Journal of Operations Management*, **22**, pp 119–150

[6] Katkalo V S 2006 Evolution of strategic management theory. *Publishing House of St. Petersburg University*, pp 203-206

[7] Porter M E and Locations C 2000 Company strategy. *The Oxford handbook of economic geography*, pp 253-274

[8] Singh H, Garg RK and Sachdeva 2018 A Supply chain collaboration: A state-of-the-art literature review. Uncertain Supply Chain Management. 6: pp 149–180

[9] Desai A and Rai S 2016 Knowledge management for downstream supply chain management of Indian public sector oil companies. *Procedia Computer Science*, **79**, pp 1021-1028

[10] Dias L S and Ierapetritou M G 2017 From process control to supply chain management: An overview of integrated decision making strategies. *Computers and Chemical Engineering*, *106*, pp 826-835

[11] Kain R and Verma A 2018 Logistics management in supply chain–an overview. *Materials today: proceedings*, ***5*(2)**, pp 3811-3816

[12] Oelze N, Brandenburg M, Jansen C and Warasthe R 2018 Applying sustainable supply chain management frameworks to two german case studies. *IFAC-PapersOnLine*, **51(30)**, pp 293-296

[13] Ellram L M and Murfield M L U 2019 Supply chain management in industrial marketing–Relationships matter. *Industrial Marketing Management*, **79**, pp 36-45

[14] Martins C L and Pato M V 2019 Supply chain sustainability: A tertiary literature review. *Journal of Cleaner Production*, **225**, pp 995-1016

[15] Jaggi H S and Kadam S S 2016 Integration of spark framework in supply chain management. *Procedia Computer Science*, **79**, pp 1013-1020

[16] Fawcett S E, Magnan G M, and McCarter M W 2008 Benefits, barriers, and bridges to effective supply chain management. *Supply Chain Management: An International Journal*

[17] Rousseau D M, Manning J and Denyer D 2008 Evidence in management and organizational science: Assembling the field's full weight of scientific knowledge through syntheses. The Academy of Management Annals, 2 (1): pp 475-515, Marketing Letters, 21, 6581

[18] Tranfield D, Denyer D and Smart P 2003 Towards a Methodology for Developing Evidence Informed Management Knowledge by Means of Systematic Review. *British Journal of Management*. **14(3)**: pp 207– 222
[19] Vidal CJ and Goetschalckx M 1997 Strategic production distribution models: A critical review with emphasis on global supply chain models. Europ J Oper Res 98:pp 1–18
[20] Beamon BM 1998 Supply chain design and analysis: Models and methods. Internat J Production Economics 55: pp 281– 294
[21] Hu J, Hu Q and Xia Y 2019Who should invest in cost reduction in supply chains? *International Journal of Pro duction Economics***207**(February 2018): pp 1–18
[22] Cai J, Tadikamalla PR, Shang J and Huang G 2007 Optimal inventory decisions under vendor managed inventory: Substitution effects and replenishment tactics. Applied Mathematical Modelling. 43(43): pp 611–629
[23] Zotteri G 2013 An empirical investigation on causes and effects of the Bullwhip-effect: Evidence from the personal care sector. *International Journal of Production Economics***143(2)**: pp 489–498
[24] Kouvelis P, Chambers C and Wang H 2006 Supply Chain Management Research and Product and Operations Management: Review, Trends, and Opportunities. Production and Operations Management. 15(3): pp 449–469.
[25] Forrester JW 1961 Industrial Dynamics. Science. 135(3502): pp 426–427
[26] Forrester JW 1958 Industrial Dynamics—A major breakthrought for decision makers. Harvard Business Review. 36(4): pp 37–66
[27] Lee HL, Padmanabhan V and Whang S 1997 Information Distortion in a Supply Chain: The Bullwhip Effect Management Science 43(4): pp 546–558
[28] Sterman JD 1989 Modeling Managerial Behavior: Misperceptions of Feedback in a Dynamic Decision Making Experiment. Management Science 35(3): pp 321–339
[29] Metters R 1997 Quantifying the bullwhip effect in supply chains. *Journal of Operations Management*. **15(2)**: pp 89–100
[30] Fransoo JC and Wouters MJF 2000 Measuring the bullwhip effect in the supply chain. Supply Chain Management: *An International Journal*. **5(2)**: pp 78–89
[31] Zhang X 2004 The impact of forecasting methods on the bullwhip effect. *International Journal of Production Economics*. **88(1)**: pp 15–27
[32] Dai J, Peng S and Li S 2017 Mitigation of Bullwhip Effect in Supply Chain Inventory Management Model. Procedia Engineering 174: pp 1229–1234
[33] Naim MM, Spiegler VL, Wikner J and Towill DR 2017 Identifying the causes of the bullwhip effect by exploiting control block diagram manipulation with analogical reasoning. *European Journal of Operational Research*. **263(1)**: pp 240–246
[34] Wang X and Disney S M 2016 The bullwhip effect: Progress, trends and directions. *European Journal of Operational Research*, **250(3)**, pp 691-701
[35] Carlsson C and Fulle´r R A Fuzzy 2000 Approach to Taming the Bullwhip Effect. Cybernetics and Systems 233: pp 228–233
[36] Giard V and Sali M 2013 The bullwhip effect in supply chains: A study of contingent and incomplete literature. *International Journal of Production Research*. **51(13)**: pp 3880–3893
[37] Disney SM and Lambrecht MR 2007 On replenishment rules, forecasting, and the bullwhip effect in supply chains. Foundations and Trends in Technology, Information and Operations Management. 2(1):1–80
[38] Heckmann I, Comes T and Nickel S 2015 A critical review on supply chain risk—Definition, measure and modeling. Omega (United Kingdom) 52: pp 119–132
[39] Singh H, Garg R and Sachdeva A 2018 Investigating the interactions among benefits of information sharing in manufacturing supply chain. *Uncertain Supply Chain Management*, **6(3)**, 255-270

[40] de Almeida M M K, Marins F A S, Salgado A M P, Santos F C A, and da Silva S L 2017 The importance of trust and collaboration between companies to mitigate the bullwhip effect in supply chain management. ActaScientiarum. Technology, 39(2), pp 201-210
[41] Olson DL and Xie M. A 2010 comparison of coordinated supply chain inventory management systems. *International Journal of Services and Operations Management*. **6(1)**:73–88
[42] Holmstrom J, Småros J, Disney SM and Towill DR 2003 Collaborative Supply Chain Configurations: The Implications for Supplier Performance in Production and Inventory Control
[43] Holweg M, Disney S, Holmstro¨m J and Småros J. 2005 Supply chain collaboration: Making sense of the strategy continuum. *European Management Journal***23(2)**: pp 170–181
[44] Geoffrion AM and Graves GW 1974 Multi commodity distribution system design by Benders decomposition. ManagemSci 20(5): pp 822–844
[45] Hodder JE and Dincer MC 1986 A multifactor model for international plant location and financing under uncertainty. ComputOper Res 13(5): pp 601–609
[46] Cohen MA and Lee HL 1988 Strategic analysis of integrated production-distribution systems: Models and methods. Oper Res 36(2): pp 216–228
[47] Bookbinder JH and Reece KE 1988 Vehicle routing considerations in distribution system design. Europ J Oper Res 37(2): pp 204–213
[48] Fisher ML and Jaikumar R 1981 A generalized assignment heuristic for vehicle routing. Networks 11: pp 109–124
[49] Min H, Jayaraman V and Srivastava R 1998 Combined location-routing problems: A synthesis and future research directions. Europ J Oper Res 108: pp 1–15
[50] Cornuejols G, Nemhauser GL and Wolsey LA 1990 Theuncapacitated facility location problem. In: Mirchandani PB, Francis RL (eds) Discrete Location Theory. Wiley, New York.
[51] Webb IR 1968 Cost functions in the location of depots for multi-delivery journeys. Oper Res Quart 19: pp 311–328
[52] Jacobsen SK and Madsen OBG 1980 A comparative study of heuristics for a two-level location-routing problem. Europ J Oper Res 5: pp 378–387
[53] Laporte G, Nobert Y and Pelletier P 1983 Hamiltonian location problems. Europ J Oper Res 12: pp 80–87
[54] Perl J and Daskin MS 1984 A warehouse location-routing methodology. J Business Logistics 5: pp 92–111
[55] Srivastava R and Benton WC 1990 The location-routing problem: considerations in physical distribution system design. ComputOper Res 17(5): pp 427–435
[56] Lee HL and Billington C 1993 Material management in decentralized supply chains. Oper Res 41(5): pp 835–847
[57] Pyke DF and Cohen MA 1994 Multi-product integrated production-distribution systems. Europ J Oper Res 74(1): pp 18–49
[58] Altiok T and Ranjan R 1995 Multi-stage, pull-type production/inventory systems. IIE Trans 27: pp 190–200
[59] Graves SC and Willems S 1998 Optimizing strategic safety stock placement in supply chains. Working Paper, Sloan School Management, MIT