Preface

This book presents the state of the art in management theories and strategic practices for decision making. Twenty articles discuss the latest issues in strategic decision support systems and data management, applied strategic decision support systems, strategic inventory management, strategic process management, and strategic supply chain management.

In the first section, five chapters discuss various strategic decision support systems. Raffaele Grasso, Marco Cococcioni, Michel Rixen, and Alberto Baldacci, in their chapter entitled "A Decision Support Architecture for Maritime Operations Exploiting Multiple METOC Centres and Uncertainty," provide a powerful tool for supporting decisions on those operations at sea which are heavily affected by meteorological and oceanographic (METOC) conditions. The tool can possibly be used to support any kind of operations at sea, like naval refueling, amphibious landing and diver operations, by incorporating operation constraints using fuzzy rules. This means that the system acts as an expert system and the knowledge base is elicited from human experts in a form close to natural language expressions (e.g., "IF wave height IS very high THEN do not use the rubber boat"). The developed system is able to exploit the METOC forecasts (sea state, wind speed, etc.) coming from multiple forecasting centers and to recommend the safest action (i.e., the one associated with the lowest risk) chosen from a pre-defined set of actions. The ability to combine forecasts coming from different METOC centers is a valuable asset of the methodology, since it is well known that different forecasting models used in oceanography have different skills and a different ability to model ocean and atmosphere interaction at different conditions. In addition the system is one of the first proposed in literature able to exploit the uncertainty associated with METOC forecasts, allowing propagating the input uncertainty on output products (i.e., the risks related to each action). Doing so the operator can also figure out whether risks related to different actions are statistically different or not. More precisely, the system output includes action rank lists, minimum risk action maps and confidence maps. In case input uncertainty is high (either because all METOC forecasts are highly uncertain or because there is a disagreement between METOC forecasts coming from different centers), it can happen that more than one action has statistically equivalent risks: in this case the decision maker can feel free to choose the preferred action, possibly taking into account other, subjective factors. The core engine of the decision support system is based on a powerful fuzzy/Bayesian hybrid framework, able to efficiently propagate the input uncertainty to the output products using the unscented transform. The authors have simulated a decision support activity on data collected during a scientific cruise held in the Adriatic Sea in 2006. The simulated operation is the deployment/recovery of underwater gliders, a particular kind of autonomous underwater vehicle. The remarkable results show that the proposed system is able to efficiently reduce the decision maker work load by automatic combining information coming from multiple METOC forecasts distributed over time and space. The added value products help the

end-user in generating course of action hypotheses linking those hypotheses to the input METOC values and associated uncertainty, and in locating areas of conflicting information due to METOC uncertainty.

Joao S. Neves and Behnam Nakhai, in their chapter entitled "Searching for Pareto-Optimal Settlements in Negotiations: The Extreme Payoffs Method," review different approaches presented in the literature for achieving efficient agreements in negotiations and propose a robust method based on extreme payoffs. The Pareto-optimal agreement is clearly defined, and maximin and minimax solutions are identified in the context of two-party negotiations. The rigor and complexity of the analysis are complemented by the presenting precise figures and a simple but realistic negotiation problem as example. Readers are gently reminded that many negotiations do not involve quantitative variables and that not all efficient frontier curves are convex as it is often assumed by economists. The authors' proposed expected payoff methods (EPM) is an elegant extension of the divide and choose procedures. The maximin and minimax solutions are just the starting points for the negotiation process and define the general boundaries of the settlement space in the negotiation problem. The two rules for achieving post-settlement settlements are clearly presented and set the stage for additional disclosure and testing by the parties so that improved agreements can be achieved. Neves and Nakhai recognize that parties often feel a need for a third party who can help the negotiators to gain trust, disclose additional information and overcome impasses. The mediated EPM is the logical extension of their proposed method by assigning to a mediator the task of applying the basic EPM principles. The mediated EPM provides useful and practical guidelines for negotiating parties and for anyone who has the opportunity to mediate a negotiation. The steps are sound and the figures presented depict in a clear-cut fashion the normal process of discovery, advancement, and agreement. The simplicity of the EPM method is its key strength. The procedures can be applied in negotiations involving quantitative and qualitative attributes, parties' preference structures of any shape, and minimal information disclosure. Readers not familiar with the basic concepts of negotiation analysis have in this article a wealth of classical references to follow. Negotiation analysts who have delved into complex models of negotiation may want to reflect on the simple assumptions of the EPM. Finally, all negotiators will benefit from additional theoretical and empirical contributions on how to implement the proposed method.

Debora Di Caprio and Francisco J. Santos-Arteaga, in their chapter entitled "Strategic Diffusion of Information and Preference Manipulation," argue that we live in a world where an increasingly larger and complex amount of information is becoming available. All of us must at some point make an informed decision. In our role as decision makers we always face two main problems: one consists of acquiring the required information while the other relates to the strategic interactions taking place with the information sender. That is, what we are told and by whom determines our subsequent actions and choices. Economists have worried about the strategic side of information transmission for quite some time. In particular, they have concentrated on the unverifiability of the information being transmitted as a constraint leading to strategic settings. On the other hand, decision support systems and knowledge management deal with situations where decision makers are presented with the selected information required to make an informed decision. In this case, the ability of decision makers to verify the information received does not necessarily prevent any manipulation from taking place, as the sender is able to select the information to be transmitted strategically. The authors formalize this idea mathematically, providing a theoretical structure that allows for the analysis of preference manipulation when the information transmitted is verifiable. More precisely, the authors illustrate how to induce different preferences on decision makers based on the information they are presented with. As a result, a sender who knows the original preferences of decision makers is able to display information in such a way

so as to manipulate their final choices. The authors provide several numerical simulations in support of their theoretical findings, which set the base for a wide range of applications of varying complexity. The novel approach developed by the authors allows for applications and extensions that spread through several fields of research. Firstly, it can play a fundamental role in economics when studying the manipulability of social choice and voting mechanisms, where the aggregation of decision makers' preferences conditions the choices made among several alternatives. Secondly, it can be used to analyze how consumer preferences can be influenced when selecting within the set of technologically superior goods introduced by firms in the market. The relevance of this second application would be in line with the increasing emphasis placed on the demand side of industrial dynamics by economists and business scholars. Finally, it introduces a strategic perspective applicable to the design of decision support systems. This perspective would complement the approach followed by the operational research literature, which generally excludes all strategic considerations from the search processes defined to study the selection of projects by firm managers.

Derrick S. Boone, Sr., in his chapter entitled "Determination of the Number of Clusters in a Data Set: A Stopping Rule × Clustering Algorithm Comparison," argues that determining the number of clusters in a data set is relevant across a wide variety of disciplines. As an example, marketing practitioners are often interested in grouping consumers into various market segments such that consumers in each segment will respond similarly to a specifically tailored marketing mix. In developing such a segmentation scheme, marketers must not only determine which segment a consumer should be assigned to, but also the most appropriate number of segments. Cluster analysis is the most widely used technique for assigning objects to clusters, and myriad algorithms and "stopping rules" exist for both assigning objects and determining the number of clusters, respectively. However, because each algorithm and stopping rule has inherent strengths and limitations, cluster solutions may differ depending on which rule/algorithm combination is used. In this chapter, the author uses a Monte Carlo study to examine the accuracy rates of six widely used stopping rules as a function of the underlying clustering algorithm. In order to assess the accuracy of different rule/algorithm combinations, the "true" number of clusters must be unambiguous and known a priori and compared to the number of clusters indicated by the stopping rule. However, because the true number of clusters is generally not known in practice, the author tested the rules and algorithms using artificially generated data sets. In generating the data sets, multiple numbers of observations, cluster densities, variables, noise, outliers, and elongated and unequally sized clusters were used to mimic the complexity of real world data. A total of 648 data sets were used to assess rule/algorithm accuracy. Selection of a stopping rule for inclusion in the study was based on it being widely used, representative of various classes of stopping rules, and/or having been shown by prior researchers to be more accurate than other reported rules. Similarly, selection of a clustering algorithm was based on it being widely used, representative of a class of clustering techniques, and having been used as a comparative standard in other studies. The findings indicate that both rule selection and clustering algorithm affect recovery of the true number of clusters. The cubic clustering criterion (CCC), when used in conjunction with mixture models or Ward's method, recovers the true number of clusters more accurately than other rules and algorithms. However, the CCC was more likely than other stopping rules to report more clusters than are actually present. The findings also suggest that stopping rule accuracy is less than that reported by prior researchers, especially when analyzing complex data. Practitioners and researchers must therefore not only be prudent in their selection of a stopping rule, but also in their selection of the underlying clustering algorithm and interpretation of the results.

Phoebe Sharkey, Wesley Hsu, Sachin Batra, and Daniele Rigamonti, in their chapter entitled "The Application of Data Mining to Evaluate the Cost-Effectiveness of Alternative Treatment Modalities in a National Medicare Database," argue that one objective of health care reform today seeks to inform clinical decision makers by providing evidence of the effectiveness, benefits and costs of alternative treatment options. New medical technologies have been associated with increases in health care costs and it is critical that costly interventions be evaluated under the scope of health care efficacy. In this research, the authors use a large nationally representative Medicare database and data mining techniques to compare the costs and effectiveness of two alternative treatment modalities for the care of patients with meningiomas. The Medicare population represents a major user of healthcare services in the United States and the claims database represents the utilization and demographic information of the healthcare services provided to these beneficiaries. These files provide a powerful resource for the application of data mining techniques to compare the cost and utilization of various clinical services as well as assess the characteristics and management of specific patient populations. Using data mining techniques, the authors compare the costs of treating meningiomas in the elderly using open surgery, radiosurgery, or a combination of the two. The costs studied encompass hospital, ambulatory, and physician payments as well as ancillary facility payments, which include home health and skilled nursing facilities. Data mining techniques are used to support data preparation, exploration and summarization as well as the creation of highly accurate descriptive models derived from the large volume of data in these Medicare claims databases. These techniques were applied successfully to create and share insights of the comparative costs, thus providing significant value for analyzing a complicated database where the number of variables involved is very large and their relationships complex and imprecise. In addition, the expertise of domain participants was critical to accurately interpret and understand some of the unexpected patterns in the data which were discovered. Health care expenditures for patients who received radiosurgery alone were significantly less ($69,347) than for patients that received surgical intervention. The data also suggest that certain patient characteristics may independently increase the costs associated with the care of patients with meningiomas. The presence of diabetes, hydrocephalus, or convulsions significantly increases the costs of health care in these patients. In contrast, such factors as gender, race, and a history of myocardial infarction or hypertension do not significantly increase health care costs. In this research, data mining techniques provided the integrated set of capabilities to identify the kinds of information that enhances the quality of decision making for consumers, health care providers, and payers. This study successfully demonstrates that these methods can be applied to large complex Medicare claims files to extract undiscovered knowledge to guide medical decision making and public policy.

In the second section, four chapters discuss strategic information management. Omprakash K. Gupta, Sadia Samar Ali and Rameshwar Dubey, in their chapter entitled "Third Party Logistics: Key Success Factors and Growth Strategies," argue that third party logistics (3PL) has been gaining importance in most places in the world. The implementation of 3PL practices is just beginning and emerging effectively. This chapter examines the Indian 3 PL Supply Chain Management and practices with respect to the key success factors and growth strategies for choosing the best alternative while selecting a 3PL service provider amongst the global logistic providers. The authors used a questionnaire to support the Analytical Hierarchy Process (AHP) based modeling, results of which were derived from experts from Delhi and National Capital Region (NCR). Respondents to the survey were categorized based on their rating of the key growth strategies on the basis of AHP. After identifying the critical success factors SERVQUAL was applied to reveal the gap between their achievement and expectation. Their research

revealed several factors which influenced the operation of 3PL service providers in India, most of whom mainly focused on cost reduction and better integration of Information Technology (IT) framework systems. Their study presents important findings for logistics managers. Realized cost reduction, geographical coverage, continuous improvement, knowledge based skills, project management skills, global capabilities, skilled logistics professionals, and real time access to information and route & load optimization are the most important factors for success as a third party logistics provider. Also expertise in information technology system is gaining importance to provide faster and better service-to-service user. This will not only give competitive advantage but also help to gain market share. As the organizations increase its market share it has to give more importance to breadth of service offered, integration among internal 3PL system, flexibility and adaptability and focus on specific industry for continuous growth of the business. To provide better services, a 3PLprovider must have complete knowledge of what the customer requirements are. Based on requirements, a better strategy can be developed by these 3PL service providers for speedy arrangements for the customers. This can help the Indian logistic sector to prosper towards Global Lead Logistics Provider (GLLP).

Sarojini Jajimoggala, V.V.S. Kesava Rao, and Satyanarayana Beela, in their chapter entitled "Maintenance Strategy Evaluation using ANP and Goal Programming," argue that in the present era of rapid technology evolution, modern technology and integrated automation of manufacturing have developed a tendency to design and manufacture equipment of greater capital cost, sophistication, complexity, and capacity, and the very survival of such systems is dependent upon high productivity and high payback ratios. All production systems are expected to be operational and available for the maximum time possible so as to maximize production volumes and profits. But, failure is an unavoidable phenomenon, all systems eventually fail. It is therefore becomes imperative that any system downtime resulting from these failures to be kept to an absolute minimum. Though the failures cannot be avoided even with the application of sophisticated technology, however, failures can be minimized with a good maintenance planning particularly on critical equipments. Proper management of critical maintenance resource can minimize the effect of non-availability of maintenance resource. Many companies think of maintenance as an inevitable source of cost. For these companies maintenance operations have a corrective function and are only executed in emergency conditions. Today, this form of intervention is no longer acceptable because of certain critical elements such as product quality, plant safety, and the increase in maintenance department costs which can represent majority of total production costs. Hence, an optimal maintenance strategy mix is necessary for increasing availability and reliability levels of production facilities without a great increasing of its operational costs. The selection of maintenance policies is a typical Multiple Criteria Decision Making (MCDM) problem with conflicting goals. Consideration of interdependence among the evaluation criteria and alternative policies for maintenance strategy provides valuable cost savings and greater benefits for any manufacturing system. Moreover, for any decision maker, it is convenient to prioritize the criteria of MCDM problem and goals of goal programming problem, in fuzzy terms. The author present an integrated approach for maintenance policy selection, using Fuzzy Analytical Network Process (FANP) and Fuzzy Goal Programming (FGP), in two subsequent stages: the first part of the analysis provide the priority levels for the different maintenance policies with respect to the evaluation criteria considering interdependencies among criteria, the second step, the formulation of the Goal Programming model, for the identification of the best maintenance strategy among four alternative strategies (corrective, condition based, time based, and opportunistic) is considered for the equipment, taking into account (i) budget and (ii) amount of hours of manpower constraints on the equipment under

consideration. In order to deal with the imprecise judgments of decision makers, the author used the fuzzy ANP combined with fuzzy GP, which is based on fuzzy preemptive priority where goal hierarchies are specified in different levels of fuzzy importance. To overcome the criticism of inconsistency, unbalanced scale of judgments and uncertainty in the pair-wise comparison process, the author used modified fuzzy LLSM method to derive triangular fuzzy priority weights of criteria.

Lafang Wang, Rui Xie, Mingyong Lai, and Jun Liu, in their chapter entitled "Backward and Forward Linkages in Chinese Steel Industry Using Input Output Analysis," studied the industrial linkages of steel industry among major steel producing countries. They performed an Input-Output analysis while linking directly to some of the most important questions in both Chinese and international industry policy today. They begin with the profile of Chinese steel industry, which shows the development of the production, consumption, technology and trade of steel industry, along with its direct and indirect contributions to Chinese economy. In this research, they set a criterion to make all the Input-Output tables from different countries compatible and divide the backward and forward linkage into direct and total linkage effect. Based on this framework, they give a detailed analysis of the backward and forward linkage effects of steel industry in eight countries, namely, China, USA, Japan, Germany, Italy, Brazil, Korea, and India. In this process, the influence coefficient of steel industry is calculated to figure out whether the backward linkage effect of steel industry is higher than other industries. Correspondingly, to investigate whether the forward linkage effect of steel industry on Chinese economy is stronger or weaker than that in other industries, the response coefficient is introduced. Furthermore, they analyse the induction effects of four categories of demand, including resident consumption, government consumption, investment and export, on steel industry in different countries. This chapter reveals that, on Mining of Ferrous Metal Ores, the backward linkage effect of steel industry in China is more significant than that in other seven countries. The forward linkage effect of steel industry on construction in developing countries including China, Brazil and newly industrialized countries is higher than that in developed countries. The total backward linkage effect of steel industry on Chinese economy is lower than that in other seven countries and the trend of this effect is decreasing in China. The investment demand is still the most important factor in inducing the Chinese steel production and this induction effect in China is higher than both some developed countries and some developing countries. The induction effect of export demand on steel industry in China is obviously lower than several OECD countries.

Jörg Schimmelpfennig, in his technical note entitled "Technical Note – The South Eastern and Chatham Railways Managing Committee: A Case for Vertically-Integrated Regional Duopolies?" shows that when the railway mania in Britain came to an end in the early 1850s, consolidation had to set in. Only a decade later, many of the older companies had been amalgamated, and new railway schemes were worked, often right from the day they were completed, by the very same neighboring railway companies that they originally were supposed to compete along. From a commercial viewpoint, any kind of merger makes sense. Due to the concentration of market power, profits should go up, while "synergy effects" the catchphrase from every manager's handbook, should be expected to set in which would reduce costs, and thus increase profits even further, if only due to the savings achieved by merging two headquarters into just one. Economically, though, i.e. taking overall economic surplus into account, the effect is anything but clear. While any rise in prices implies a reduction of consumer surplus any hope that this might be offset remains, well, just a hope. In theory, a misuse of market power could be prevented by good regulation. However, not only did economic 19th century railway regulations left much to be desired – by and large, apart from the penny-a-mile Parliamentary trains created by the 1844 Gladstone Act, it confined itself to technical and safety issues – even today's railway regulation seems unaware of fundamental

insights provided by regulation economics. Subsequently, the Board of Trade, when looking at the merits of proposed railway mergers, practically put a halt to any large-scale railway mergers from the 1870s onwards on competition grounds. The one exception was the (all but in name) merger of the South Eastern Railway and the London, Chatham and Dover Railway on January 1st, 1899. It was a unique situation. Both served the very same region, Kent, and practically all twelve towns within, with lines crisscrossing each other, and their respective London termini being just 15 minute walks apart. It came close not only to an industrial organization textbook example, but to a management textbook example as well. Interestingly, the chapter paints a very different picture. Using data from the annual Board of Trade Returns he is able to show that costs, rather than going down due to any supposed synergy effects, went up by between 3.5 percent (for total economic costs, including opportunity costs of capital) and 8 percent for variable costs. From a microeconomic viewpoint the results are very much in line with the concept of the so-called o-ring production function suggesting that a railway merger, due to the increased level of complexity of the new system and thus overall network reliability depending on a larger number of subsystems having to work in harmony, leads to a ceteris paribus – in particular when wanting to keep overall reliability unchanged from pre-merger levels – exponential rise in costs which might offset any other cost saving opportunities. Using these findings, the author turns his focus on the way railways have been privatized in Britain. By vertically separating track ownership from the train-running operations and offering the passenger part of the latter as 25 regionally based franchises, one had originally hoped for the arrival of open-access operators leading to the competition on the regional networks. With one minor exception no such entry has taken place until today, though. Therefore, rather than increasing competition, the former nationwide state monopoly has only been replaced by one nationwide upstream monopoly and a layer of regional downstream monopolies. It merely increased transaction costs – previously these were intra-firm only, i.e. between the respective departments of British Rail – and required another layer of regulation. The author suggests that a return to the kind of organization found in the late 19th century might be preferable instead: reintegrating track ownership and train operating and using the original non-amalgamated networks as a blueprint, vertically-integrated regional duopolies could be created. While this might be difficult if not impossible to achieve in some parts of the country due to too many lines having been lifted, some of them even before the infamous Beeching cuts, there are regions, and in particular the South East as well as the North West, where many of today's lines are still worked just as they were by the original companies. It would do away with unnecessary transaction and regulation costs, let alone lawyers' fees, and it would reduce the need for regulation even further by seeing real competition between railway companies for the first time in almost seven decades.

In the third section, five chapters discuss strategic inventory management. Chandra K. Jaggi, Satish K. Goel, and Mandeep Mittal, in their chapter entitled "Pricing and Replenishment Policies for Imperfect Quality Deteriorating Items under Inflation and Permissible Delay in Payments," show that most of the inventory models were developed under the assumption "all the units produced or purchased are of good quality" in the existing literature. However, in practice, this type of assumption is unrealistic as it is rare to produce all the items in a perfect condition due to several factors. As a result, some defective items are also produced along with non-defective one. These items are classified by inspection which is a common practice adopted in the most of the organizations. After inspection, the non-defective items are retained to fulfill the demand and the defective items are returned back to the supplier. Further, in the traditional economic order quantity (EOQ) model, it is assumed that the retailer must pay for the items when he receives the lot. However, in real practice, due to the globalization of market economy and also to the fierce competition among the suppliers, they are bound to offer trade credit to the retail-

ers to promote their business. From the retailer's point of view, generally trade credit is considered as the most flexible sources of short term financing and during this trade credit period, neither capital nor interest is payable to the supplier. Therefore, in the economical point of view with respect to the retailer, he should wait to settle the account up to the last day of the credit period allowed by the supplier. The authors for the first time have proposed an excellent idea by introducing several realistic factors in developing an inventory model. Accordingly, they have developed the model for deteriorating items with initial-inspection under trade credit and inflation over a finite planning horizon using discounted cash flow (DCF) approach which provides the proper and exact recognition of various costs in the inventory analysis. Demand rate is taken as a function of selling price. The proposed model jointly optimizes retailer's selling price and also the number of replenishments by maximizing the average profit. Besides the numerical illustration, a comprehensive sensitivity analysis is also conducted to explore the effects of changes of the key parameters (viz. price elasticity, deterioration rate, permissible delay period, inflation rate, fraction of non-defective items, discount rate) on the optimal results. The findings provide very important managerial insights to the decision makers for deciding the appropriate ordering policy. It is apparent from the results that for highly elastic demand, the retailer should be more vigilant while ordering and in the highly liquid market, he should order less but more frequently that eventually increases his average profit. Further, the retailer should order less but more frequently for the deteriorating items and procure more but less frequently in the inflationary market.

Gour Chandra Mahata and Puspita Mahata, in their chapter entitled "Optimal Ordering Strategy of a Replenishment Policy for Deteriorating Items under Retailer's Partial Trade Credit Policy," argue that achieving effective coordination among suppliers and retailers has become a pertinent research issue in supply chain management. A profitable decision policy between a supplier and the retailers can be characterized by an agreement on the trade credit scenario such as permissible delay in payments. The trade credit financing produces two benefits to the supplier: (1) it should attract new customers who consider it to be a type of price reduction; and (2) it should cause a reduction in sales outstanding, since some established customers will pay more promptly in order to take advantage of trade credit more frequently. In real life business via share marketing, trade credit financing becomes a powerful tool to improve sales and profits in an industry. One level trade credit financing refers that the supplier would offer the retailer a delay period trade credit but the retailer would not offer the trade credit to his/het customers. That is, the retailer could sell the goods and accumulate revenue and earn interest within the trade credit period but the customer would pay for the items as soon as the items are received from the retailer. In most business transactions, this assumption is unrealistic. Usually the supplier offers a credit period to the retailer and the retailer, in turn, passes on this credit period to his/her customer demand to develop the retailer's replenishment model. That is two levels of trade credit. This new viewpoint is more matched to real-life situations in the supply chain model. They realize the situation under which the retailer has the powerful decision-making right. They assume that the retailer can obtain the full trade credit offered by the supplier and the retailer just offers the partial trade credit to his/her customer. In practice, this circumstance at a retailer is more matched to real life supply chains. However, the perishability of goods is a realistic phenomenon. In real-life situations there are certain products like volatile liquids, medicines, food stuff, blood bank, materials, etc., in which the rate of deterioration due to vaporization, damage, spoilage, dryness etc. is very large. Therefore, the loss due to deterioration should not be ignored. This chapter investigates the EOQ inventory model for a retailer under two levels of trade credit to reflect the supply chain management situation. They assume that the retailer maintains a powerful position and can obtain full trade credit offered by supplier yet retailer just offers the partial trade credit to custom-

ers. Under these conditions, retailer can obtain the most benefits. Then, they investigate the retailer's inventory policy for deteriorating items in a supply chain management situation as a cost minimization problem to determine the retailer's inventory policy. A rigorous mathematical analysis is used to prove that the annual total variable cost for the retailer is convex, that is, unique and global-optimal solution exists. Mathematical theorems are developed to efficiently determine the optimal ordering policies for the retailer. The results in this chapter generalize some already published results. Finally, numerical examples are given to illustrate the theorems and obtain a lot of managerial phenomena.

T.V.S. Ramamohan Rao, in his chapter entitled "Explaining Involuntary Spinoffs from Teams," argues that a firm generally consists of many interrelated teams. In practice, some members of a team are specific to it while others may be transferable across teams. In the context of team formation synergies represent increases in output given costs. The firm will efficiently integrate a new activity and achieve synergies by forming a new team if it (a) can attract the requisite scope of talents and achieve the necessary quantities of each talent, (b) can accommodate the strategic bargaining power of the existing team members in resource allocation across talents, and (c) has the organizational capabilities to realize potential synergies. Size will be a crucial parameter in determining efficiency because a significant amount of managerial effort will be necessary to coordinate the work. More recent literature noted that the elasticity of substitution between talents determines the scope of the organization. For, when it is low, distinct talents can operate independently without much need for coordination. Similarly, when it is high the management will find it easy to shift team members from one team to another. However, transferring individuals across teams may involve problems of procedures as well as psychological traits of team members in associating with each other. Reorganization may either result in cohesive integration or disagreements. Confronted with possibilities of disagreement the management devises strategies to overcome it. These strategies can be pretty diverse. For, management strategy essentially consists of thinking out of the box depending on the circumstances specific to a context. The correct choice of the elasticity of substitution among talents is only one of the strategies. Obviously many others have been implemented with varying degrees of success. This suggests that whereas each chosen strategy has an internally consistent logical basis no two teams will choose identical strategies. Contemporary research is trying to isolate common strategic features across firms while recognizing the significant differences between firms. However, the features chosen for analysis are generally not mutually exclusive. In this study, T.V.S. Ramamohan Rao posits that team synergy is dependent on the elasticity of substitution between talents in a team and the implied organizational structure. The conclusions are as follows. First, the perception of the lack of organizational abilities of the original firm is at the apex of the spinoff decision. The problem becomes acute if the new ideas are closely substitutable to the existing activities. Second, even when adequate organizational capabilities are discernible the managers of the existing product divisions may resist integration, and thereby make a spinoff necessary, if they do not attract bargaining power and resource allocation commensurate with their expectations.

M. Valliathal and R. Uthayakumar, in their chapter entitled "Fuzzy Economic Production Quantity Model for Weibull Deteriorating Items with Ramp Type of Demand," argue that inventory is a quantity or store of goods that is held for some purpose or use. These goods are maintained on hand at or near a business' location so that the firm may meet demand and fulfill its reason for existence. A manufacturer must have certain purchased items (raw materials, components, or subassemblies) in order to manufacture its product. Running out of only one item can prevent a manufacturer from completing the production of its finished goods. The company or business can benefit greatly from using mathematical models for inventory. To help maximize profits and prevent having unused merchandise, many companies use

mathematical models. Inventory management, or inventory control, is an attempt to balance inventory needs and requirements with the need to minimize costs resulting from obtaining and holding inventory. Sometimes, a firm may keep larger inventory than necessary to meet demand and keep the factory running under current conditions of demand. When the demand is assumed to be fixed and known, the inventory models are called deterministic inventory models. The deterministic models to be discussed are still of interest because they provide a simple framework of introducing the methods of analysis that will be used in more complicated systems and because, sometimes, they are useful in examining certain aspects of real world problems. Demand is the most important component of an inventory system. Inventories are kept so that demands may be met, orders filled, requirements satisfied. Inventory problems exist because there are demands; otherwise, there is no inventory. This may be deterministic or probabilistic or fuzzy. For long, inventory models have dealt with the case that demand is either a constant or a monotonic function. Constant demands take place in the fully developed stage of the item and monotonic in the beginning or last stage of the cycle of life. In the fast moving world, during shortages some customers are willing to wait and others are not. Most of the classical inventory models consider complete backlogging or complete lost sales case. Recently, inventory models based on the concept of partial backlogging have been found to be more suitable for the practical life situations than that of complete backlogging. The items stored in the inventory are generally subject to deterioration. The demands of fashionable goods increase up to a certain level and after that the demand becomes steady. Such type of demand functions are known as ramp type of demand. In the crisp inventory models, all the parameters in the total cost are known and have definite values. But in the practical situation it is not possible. Different fuzzy inventory models occur due to fuzzy various cost parameters in the total cost. In this chapter fuzzy concepts are used to develop an inventory model by considering the traditional costs such as setup cost, holding cost, shortage cost and opportunity cost due to lost sales to be triangular fuzzy numbers. Signed distance method is used to defuzzify the cost function.

Chandra K. Jaggi and Amrina Kausar, in their chapter entitled "Retailer's Ordering Policy in A Supply Chain when Demand is Price and Credit Period Dependent," argue that due to the globalization of market economy, trade credit plays an important role in capturing the maximum market share. Generally, suppliers offer trade credit to the retailers to promote their business. As a result of this policy the retailers can gain capital without any initial investment. Hence, the retailer and the supplier both shall be benefited through this policy. This type of policy is termed as one level trade credit policy. However, getting motivated from this policy, the retailer also extends this benefit to his customers. This is known as two level trade credit policies. Undoubtedly, it also involves a great risk of non-payment. To reduce the risk of non-payment, supplier/retailer, at times use a partial trade credit policy in which usually the suppliers/retailers demand a certain percentage of the total amount from the retailers/customers at the time of purchase and offers the credit for the remaining amount. Usually, it is assumed that the demand does not get influenced by the length of the credit period. However, in reality, the length of the credit period offered has a positive impact on the demand. Moreover, it is observed that the demand of Fast Moving Consumer Goods (FMCG) is not only influenced with the length of credit period offered but also greatly affected with price. Here in this section the authors very well integrated these pragmatic features namely; partial trade credit, price, as well as credit sensitive demand and developed a very useful model which is very much consistent with the real life. Through this model the retailer can determine the optimal replenishment time, credit period, and price that maximizes his profit. The model is not only illustrated with the help of numerical examples but also supported by the comprehensive sensitivity analysis. The effect of different parameters on the optimal replenishment time, credit period and price

has been investigated. Results signify the following managerial phenomena: when the supplier provides a longer credit period, the retailer replenishes the goods more often. In other words, the retailer will shorten the cycle time and reduce the selling price in order to take advantage of the longer credit period and if the ordering cost is higher, it is reasonable that the retailer lengths the cycle time to reduce the frequency of replenishment and he marginally increases the selling price. Additionally it is observed that retailer should offer lower credit period to customers when the rate of saturation of demand is high. Briefly, findings of this chapter, not only provide a valuable reference for decision-makers in planning and controlling the inventory, but also provide a useful platform for many organizations that use the decision rule to improve their total profit.

In the fourth section, three chapters discuss strategic process management. Veena Goswami and G. B. Mund, in their chapter entitled "Optimal Thresholds of an Infinite Buffer Discrete-Time Two-Server System with Triadic Policy," carried out an analysis of a discrete-time two removable servers in the controllable infinite-buffer Geo/Geo/2 queuing system under the triadic (Q,N,M) policy that have potential applications in modeling computer and telecommunication systems, computer networks, etc. In the triadic policy, whenever there are no jobs in the system, both the servers remain inactive until certain specified conditions arise. Both the servers are initially assumed to be inactive. When the number of jobs waiting for service reaches a specific number, denoted by N, which is a decision variable, one of the servers becomes active instantly. When the number of jobs waiting for service increases to another specified level, say M (M > N), the other server also becomes active instantly. If both the servers are active and the number of jobs in the system decreases to Q, $1 \leq Q < N$, the server just finishing a service becomes inactive in the system at that time. In addition, if the number of jobs in the system drops down to zero while one server is active, the server becomes inactive. The number of acting servers can be adjusted depending on the number of jobs in the system one at a time at arrival or at service completion epoch. Analytical closed-form solutions of the infinite-buffer Geo/Geo/2 queuing system operating under the triadic (Q N,M) policy have been derived. They have developed a recursive method to find the steady-state probabilities. The recursive method is powerful and easy to implement. They obtained the analytically explicit expressions for the stationary probability distributions. Some performance measures such as probability of various server states, expected lengths of the idle period, busy period and busy cycle of jobs in the system have been discussed. Computational experiences with a variety of numerical results in the form of tables and graphs are presented to display the effect of the system parameters on the performance measures. They have developed the total expected cost function to obtain the optimal operating policy and the optimal service rate at minimum cost using direct search method. Cost analysis may be helpful to improve the grade of service by selection of appropriate system parameters. Based on the numerical results, they have made an effective decision on exact solutions for practical and general queuing system with quantitative measurement. This model may be useful to engineers / managers who design an efficient system with economic management. The economic importance of this model resides in the multiple applications to production processes, since most of them operate on a discrete time basis. The optimal control of the triadic policy minimizes the cost model which is a main objective from the enterprise point of view.

Ebrahim Teimoury, Mohammad Modarres Yazdi, Iman Ghaleh Khondabi, and Mahdi Fathi, in their chapter entitled "Two-Facility Location Problem with Infinite Retrial Queue," use a different concept of queuing theory in the field of facility location problems. The authors analyze the effect of congestion on locating the service facilities in a specific problem where locating two service facilities are under study. The show that some previous studies have tried to locate facilities by using queuing theory concept but

in their study the effect of retrial queue is analyzed. Considering a service queue for each facility and a retrial queue for demands which couldn't be satisfied due to servers' occupation, the authors modeled the location problem such as a three-dimensional queuing problem which is studied as a Markov process in the field of queuing theory due to its specifications. In this chapter the authors study the problem of locating two facilities among some possible locations where each facility has a limited number of servers and when all the servers are busy, the entering demand will go to a retrial queue. All the entrance occurrences follow Poisson distribution and the service time in each facility is considered to follow exponential distribution. They also argue that solving more than two-dimensional queuing problems is a difficult work in the field of queuing theory. They consider the problem of two independent two-dimensional queuing systems and find the final answers by using the independent probability law. The use the Matrix Geometric Method (MGM) and balance equations to find the steady state probability. Finally, the authors present a cost based optimization function which finds the best two locations out of three possible locations due to the minimum cost obtained as a mixture of fixed cost of locating a facility in each possible location. The servicing cost related to each opened facility and the related cost of customer waiting in each queue is considered the service dissatisfaction cost. This kind of location problems can be handled in banks, hospitals, transportation organizations, or some emergency services.

Saeed A. Bagloee and Christopher G. Reddick, in their chapter entitled "A Logit Model for Budget Allocation Subject to Multi Budget Sources," argue that in a complex and extended system such as a government, the proper allocation of the budget to its sub-entities is always a major challenge. As such for cases like governments, a situation in which multiple budget sources with different concerns available to the sub-entities is common. This study develops an applicable model for large-scale cases in which identifying the flow of capital or budget from (multiple) sources to the sub-entities is sought. Since the influential factors to the allocation process may be mingled with some unknown parameters (as well as known factors) a logit model is developed. Logit models are able to consider the unknown factors of the process in which sub-entities approach budget-sources to meet their budget needs. The previous studies have largely ignored the existence of the unknown factors in the process. The logit model is based on the concept of utility, which quantifies the advantage of approaching budget-sources for the sub-entities. The sub-entities will find themselves competing with each other in order to acquire their budget needs from the best suited and available source(s). Therefore the budget allocation problem of the logit form is written as a mathematical programming formulation in which the competition is modeled. The proposed competition problem is explicitly subject to the availability of budget as a capacity constraint. The competition problem is converted to dual-format and a solution algorithm is developed for the dual competition problem. The main advantage of the dual problem is that once it is solved the results contain shadow prices of the budget sources. The shadow prices have important economical interpretations. It implies the value or price of supplying a budget-source with one additional unit of budget change. If the respective budget-source is already depleted and the competition to acquire from this budget source had been high, the shadow price will be high. In order to have an efficient budgeting system the shadow prices of all the budget-sources must be even. Therefore the shadow prices can assist the authority to regulate the laws, criteria, and procedures of the system. A Successive Coordinate Descent (SCD) method is proposed as the solution algorithm for the dual format of the competition problem. In this chapter, the proposed methodology is tested numerically. The results shows that the algorithm can be efficiently applied to large-size cases in a way the speed of convergence in outputs is high. The application of this methodology can be extended to the banking system. For instance, in the numerical example they show how to regulate the interest rates enforced by the banks on loans.

In the fifth section, three chapters discuss strategic supply chain management. Abirami Radhakrishnan, Dessa David, Douglas Hales, and Sri V. Sridharan, in their chapter entitled "Mapping the Critical Links between Supply Chain Evaluation System and Supply Chain Integration Sustainability: An Empirical Study," argue that as firms struggle to optimize their supply chain performance, it is widely advocated that attention be paid to their Supply Chain Integration capabilities (SCI) due to the numerous positive benefits it promises. Despite these acclaims, there are some studies that indicate the advantages of SCI diminish over time. This finding is counter-intuitive in that supply chains achieving superior performance through SCI capabilities should be able to maintain the capabilities over time. The authors did an exemplary job addressing this critical issue of successfully sustaining supply chain integration and its benefits long term. They provided theoretical and empirical support for explaining why supply chain partners fail to sustain SCI in the long term and thus fail to maintain superior supply chain performance. Additionally, they created a roadmap for partners to sustain SCI and their benefits. Despite the importance of sustaining supply chain integration and the need for superior supply chain performance, there is paucity of research concerning the development and application of theories to explain how to sustain it. The authors in this chapter have taken steps to fill this gap. They provided one of the first studies examining the relationship between supply chain integration and supply chain evaluation system actually works to sustain SCI. This study provides a perspective that achieving supply chain integration (SCI) is different from sustaining SCI (SCS). This is important as firms develop their supply chain strategy. When companies in a supply chain develop a competency in sustaining supply chain integration, they derive long-term strategic benefits, and not temporary benefits. The research highlights that one of the major roadblocks to sustaining SCI is the lack of a proper supply chain evaluation system (SCPM). Development of supply chain wide evaluation system (SCPM) interacts with SCI to foster supply chain integration sustainability (SCS). The research provides evidence that SCPM requires not only the development of appropriate metrics but also a system to develop capabilities in monitoring internal and external business processes. These competencies are important because they are difficult to mimic by competitors and therefore lead to sustainability of the supply chain. The findings of this study suggest that both supply chain integration capability and supply chain evaluation capability help in the development of competency in supply chain integration sustainability, with supply chain evaluation capability having a stronger effect on supply chain integration sustainability than supply chain integration capability. If companies in a supply chain are unable to sustain integration, then it would lead to a tremendous waste of financial and temporal resources and consequently, harm the ability of the supply chain to stay competitive. The remarkable study fills a gap in the supply chain literature on sustaining supply chain integration. This research can assist practitioners in achieving sustainable supply chain integration capabilities and thus superior supply chain performance. Additionally, this study shows that firms can experience greater success with sustained integration by establishing a supply chain wide evaluation system. This study also provides a foundation for several types of research in this field.

Jagdish Pathak and Navneet Vidyarthi, in their chapter entitled "Cost Framework for Evaluation of Information Technology Alternatives for Supply Chain," argue that one of the critical enablers for an efficient and effective supply chain is timely planning and information processing across the entire value-added chain. They present an analytical model for selecting the right mix of analytical software and hardware alternatives at various planning and execution levels of an organization to remain competitive in a supply chain. They quantify factors such as quality, reliability, flexibility, timeliness, and organizational compatibility into cost components that form the weighted cost function. The weights of

the various cost components of software and hardware are derived from pair-wise comparison. These weights account for the relative importance of alternative supply chain strategies for an organization. They present a numerical example to demonstrate the applicability of the proposed framework and exhibit the efficacy of the procedures and algorithms.

Jun-Der Leu, Yu-Tsung Huang, and Li-Ting Huang in their chapter entitled "Effectiveness of Inter-Organizational Systems in Global Manufacturing: Evidence from Industrial Cases in Taiwan," show that the inter-organizational systems are used to assist in business data sharing and collaboration among enterprises based on the ERP application. However, they argue that their resource requirements and failure rates are high and as a result many organizations are concerned about the Business-to-Business (B2B) effectiveness. In this study, they investigate the performance of inter-organizational system applications. They evaluate the financial performance of twelve global electrical and electronics manufacturing companies and show no improvement in operational efficiency or profitability in these twelve companies after the inter-organizational system application. They also study the influence of business scale, number of EDI suppliers, and inter-organizational system scope. Business scale and number of EDI suppliers also do not have a significant influence on the performance. In terms of inter-organizational system scope, they did find that the companies which carry out EDI-induced integration with their up- and down-stream business partners show better profitability than those that do not. Based on the results, they suggest that a global manufacturing enterprise has to develop appropriate enterprise architecture before the inter-organizational system implementation. They also discuss the importance of process optimization and suggest upgrading the level of enterprise information integration to the process integration level. Finally, they suggest that the inter-organizational system has to include the whole logistic system for better effectiveness.

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