GUEST EDITORIAL PREFACE

Special Issue on Heuristics and Meta-Heuristics for Integrated Supply Chain Optimization Problems

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Companies are working hard to improve their organizational competitiveness in the global market. This market is uncertain, cost competitive and dynamic in nature. Therefore, companies are trying to improve their agility level and be flexible and responsive in meeting the fast and ever-changing market requirements with the trade-offs of cost and service. In their efforts to achieve this agility and improve their efficiency and competitiveness, many companies have decentralized their non-core activities by outsourcing and developing the concept of optimization. Optimization is today, therefore, an integral part of supply chain design and management. Optimization has strengthened with the development of information and communication technologies that include electronic data interchange, the Internet and World Wide Web to overcome the ever-increasing complexity of the systems that drive buyer–supplier relationships. With the world becoming a global marketplace, suppliers and customers are located all over the world, and any reasonably sized organization must incorporate activities both inside and outside itself, requiring an integrated optimization on various value-adding activities along the supply chain.

Many optimization problems of practical, as well as theoretical, importance consist of the search for a "best" configuration of a set

of variables to achieve certain goals. They divide naturally into two categories: those where solutions are encoded with real-valued variables and those where solutions are encoded with discrete variables. Among the latter, we find a class of problems called Combinatorial Optimization problems. These problems in the supply chain are characterized by their well-structured problem definition as well as by their huge number of action alternatives in practical application areas of reasonable size. Especially in areas like routing, task allocation, or scheduling such problems often occur. Their advantage lies in the easy understanding of their action alternatives and their objective function. Therefore, an objective evaluation of the quality of action alternatives is possible in the context of combinatorial optimization problems. Utilizing classical methods of Operations Research often fails due to the exponentially growing computational effort. Therefore, in practice, heuristics and meta-heuristics are commonly used, even if they are unable to guarantee an optimal solution. Meta-heuristics that mimic natural processes developed over the past thirty years and have produced good results in reasonable short runs for this class of optimization problems. Even though those bionic heuristics are much more flexible regarding modifications in the problem description when compared to classical problem specific heuristics, they are often superior in their results.

The aim of this special issue is to publish cutting-edge research, findings and exchange knowledge on new theories, methodologies and case studies investigating the impact and development of heuristics, meta-heuristics and analytical techniques for integrated supply chain problems. Thus, theoretical, empirical, and experimental works, as well as case studies, are covered with the practical implications. Accordingly, this special issue is aimed at meeting the challenges posed and overcoming the existing gaps. It includes state-of-the-art research in the development of methods, models, techniques, heuristics and meta-heuristics for integrated supply chain problems. It is intended for practitioners from industry who use techniques

from a wide range of fields: mathematical programming, supply chain and logistics management, and process systems and operations engineering. The practical applications in the form of quantitative and qualitative case studies based integrated supply chain problems is the focus of this special issue. The papers of this special issue have real value relevance, be primarily focused on real time implementation and the target audiences of this special issue are researchers, managers, practitioners and consultants.

We are delighted to offer six articles in this issue of the *International Journal of Information Systems and Supply Chain Management* (IJISSCM) to address these matters.

The first research article by Shoban Babu and Mitul Shah designed genetic algorithms to solve the Multiple Forecasting Models Parameters Adaptation Problem (MFMPAP) to optimize the model parameters and selected the appropriate forecasting model for a given forecasting scenario. Authors have used three forecasting models: single exponential smoothing (SES), double exponential smoothing (DES) and Winter's triple exponential smoothing (WTES). Author claims that this approach facilitates the users to identify the forecasting model with a parameter value which minimizes the average of forecast errors across all the time series. Authors have tested on randomly generated data sets and the results are compared with few randomly selected samples. For a fair comparison the samples are tested in SAS 9.1 and the results are compared with sample results which used GA suggested forecasting model and parameter values.

The second research manuscript by Saravanan and Sundararaman proposed heuristic methods based on Ant Colony Optimization and Simulated Annealing algorithms to solve vehicle routing problems. Computational results are reported on randomly generated problems. The proposed methods significantly improve in minimizing the total distances travelled by the vehicles. Authors have proved that the Ant Colony based heuristic and Simulated Annealing Algorithm based heuristic can be successfully

used to solve a basic vehicle routing problem. Authors have stated that these problems are receiving increasing attention due to their relevance to real world problems, in particular, for distribution in urban environments. Authors have proved that Ant Colony based heuristic is an effective approach than the Simulated Annealing based heuristic for solving the vehicle routing problems with capacity constraints.

The third article by Sivakumar, Ganesh, Punniyamoorthy and Koh explored the integrated production distribution problem by considering a Two - Stage Collection - Distribution (TSCD) Model for blood collection and distribution that faces a deterministic stream of external demands for blood product. A finite supply and collection of blood at stage one Central Blood Bank (CBB) has been assumed. Blood is collected at stage one CBB and distributed to stage two Regional Blood Bank (RBB), where the storage capacity of the RBB is limited. Packaging is completed at stage two (that is, value is added to each item, but no new items are created), and the packed blood bags are stored which is used to meet the final demand of customer zone. During each period, the optimal collection rate at CBB, distribution rate between CBB and RBB and routing structure from the CBB to RBB and then to customer zone, must be determined. This TSCD model with capacity constraints at both stages is optimized using Genetic Algorithms (GA) and compared with the standard operations research software LINDO for small problems.

The fourth research article by Sandeep Dullri and Ganesh Muthusamy stated that service firms have become highly competitive in terms of providing the delivery. The delivery quality is in terms of delivery commitments. Delivery commitments impact the customer in deciding for the service. Computing the delivery commitments in stochastic service systems is a real challenge. Delivery commitment forms a key parameter in formulating the service level agreements in B2B markets. Authors have proposed a queuing theoretic approach for computing the delivery commitments. We employ basic Probability theory to propose two bounds on delivery commitment time. Further, authors have investigated the effect of learning in service networks. Authors have believed that their work can provide a simple and easy framework for quality analysis in stochastic service networks.

The fifth research paper by Vennila, Ruban Dev Prakash, Malini, Birundha, Sumi and Evangelin Jeba addressed the principles of genetics involving natural selection and evolutionary computing applied for producing an economic dispatch. Economic dispatch (ED) is an optimization problem, which allocates the generation among the generators in a power system so that total cost of generation is minimized maintaining the system operating constraints. Authors have designed a decision supporting system using genetic algorithm (GAs) to solve the problem of allocation of economic dispatch problem which is known to be a NP-hard problem. As GAs work on binary numbers, the requirement of memory space and the computational time is very less. The genetic algorithm applicable to economic dispatch problem is very effective. The results show that the AGs can solve complex problems in the power systems, economic load dispatch and their applications are promising area to explore.

The last research article by Resmi Ann Thomas and Kamalanabhan stated that it is not an uncommon trend in the present times that the number of women entrepreneurs continues to increase steadily. They also stated that it is also found that women enter entrepreneurship majorly due to necessity than opportunity orientation. They raised the questions: If that is the case does entrepreneurial impression management differ for both the gender? How does the necessity based entrepreneur face the increased competitive approaches of opportunity based entrepreneurs? Authors claimed that this study attempts to find out the difference between impression management techniques and different social competencies employed by women and male entrepreneurs. Data was collected by means of questionnaire to new ventures and a total of hundred and seventeen observations were collected, from fifty seven

females and sixty male entrepreneurs. It was observed that impression management techniques employed by women are different from that of males. In contrast to the sex role typing of females it was seen that women use assertion oriented techniques than compared to males. The results provide evidence that the potential for developing social competence and impression management techniques and promoting the abilities needed for a free and self-determined career has not been exhausted by any means.

The guest editors would like to thank the authors for their valuable contributions reserved for this special issue and the reviewers for their precious referee work. Special thanks to Prof. John Wang for his support, guidance, advice and assistance in the preparation of this feature special issue. We hope that our readers will yield lot of insights and benefits from work of these impressive researchers and practitioners of this special issue. Our team welcomes comments and suggestions from our readers, researchers and visitors, and greatly appreciates your feedback. We look forward to building on this special issue with many more issues over the coming years, as we engage in productive dialogue that confronts the dynamic social science and environmental challenges faced in today's world.

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