

# Preface

Welcome to the *Proceedings of the Eighth International Conference on Management Science and Engineering Management (ICMSEM2014)* held from July 25 to 27, 2014 at Universidade Nova de Lisboa, Lisbon, Portugal.

The International Conference on Management Science and Engineering Management is the annual conference organized by the International Society of Management Science and Engineering Management (ISMSEM). The goals of the Conference are to foster international research collaborations in Management Science and Engineering Management as well as to provide a forum to present current research results in the forms of technical sessions, round table discussions during the conference period in a relaxed and an enjoyable atmosphere. This year, 1,337 papers from 37 countries were received and 138 papers from 14 countries were accepted for a presentation or poster display at the conference after a rigorous review. These papers are from countries including Spain, Australia, Germany, France, Canada, Pakistan, China, The USA, Japan, Portugal, Iran, The Netherlands, Korea, and Azerbaijan. They are classified into eight parts in the proceedings which are Intelligent Systems, Decision-Making Systems, Manufacturing, Supply Chain Management, Computing Methodology, Project Management, Industrial Engineering, and Information Technology. The key issues of the eighth ICMSEM cover various areas in MSEM, such as Decision-Making Methods, Computational Mathematics, Information Systems, Logistics and Supply Chain Management, Relationship Management, Scheduling and Control, Data Warehousing and Data Mining, Electronic Commerce, Neural Networks, Stochastic models and Simulation, Heuristics Algorithms, and Risk Control. In order to further encourage the state-of-the-art research in the field of Management Science and Engineering Management, the ISMSEM Advancement Prize for MSEM will be awarded at the conference to these researchers.

A total of 138 papers were accepted and divided into 2 proceedings, with 69 papers in each proceeding. In order to find out the research topics among the accepted papers, the NodeXL was applied. To begin with, key words from 69 papers were excerpted as follows: Computing methodology, Particle swarm optimization (PSO), Binary particle swarm optimization, Industrial engineering, Flexible job-shop scheduling problem (FJSP), Project management, Information technology, Knowledge network, Synergy effect, Self-organizing maps, Entropy, Black-Scholes model, Risk management, Customer churn prediction, Data

mining, Classifiers, Demographic characteristics, Regression analysis, Dynamic programming, Optimization, Multiobjective Optimization, Scheduling, Assembly line balancing models (ALB), Electronic commerce, Vector Space Model, Information retrieval, Maintenance, KPI, Decision making, Autocorrelation, Default distance, Psychological capital, Turnover intention, Organizational support, Ethnic regions, Public utilities, Interpretative structural modeling, Grey topologic prediction, Relationship capital, Demand-pull absorptive ability, Innovation, International travels, Data envelopment analysis, Safety engineering, Clustering algorithms, RFID, Healthcare knowledge, Disease control, Process development, Bayesian networks, Quantitative test, Fuzzy sets, Virtual corporation, Cultural identity, Supply chain management, Random variables, Expected objective, Resource allocation, Behavioral research, Artificial neural network, Environment management, Decision-making systems.

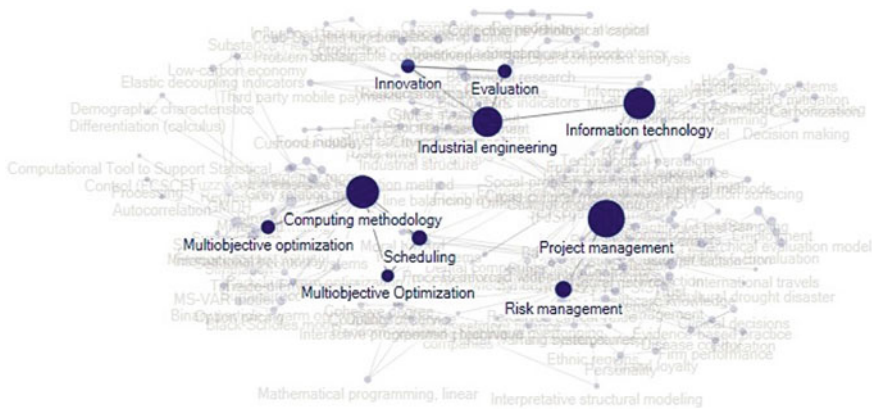
The significance of the keywords not only lies in its frequency, but the connection between the keywords is also very important in our study of how these papers revolve around the theme of Engineering Management (EM). The field of EM provides a set of concepts and metrics to systematically study the relationships between the key words. The methods of information visualization have also become valuable in helping us to discover patterns, trends, clusters, and outliers, even in complex social networks. In the preface, the open source software tool NodeXL was designed especially to facilitate learning the concepts and methods of EM as a key component.

Using the NodeXL, all of the 506 keywords involved in the 69 papers were analyzed. To begin with, the preliminary processing was executed on all the key words. Except for a unified expression of words, all the key words with the same meaning and the words including the meaning of similar key words have been unified. For example, “multiobjective problems,” “multiobjective models,” and “multiobjective optimization” have finally been unified to “multiobjective optimization.” Through the preliminary processing, the keywords have reduced to 453, making it possible to constitute network efficiently.

These processed keywords, represented as the vertexes in NodeXL will be visualized in a network diagram. In the network diagram, the vertexes' sizes have been set to depend on the number of other vertexes associated with it. The more the vertex connects with other vertexes, the higher centrality it would be, which reflects the keyword's important status in the field of EM. In other words, this key word is likely to represent an important issue in EM. At the same time, the vertexes' shapes have been set to depend on their betweenness and closeness centrality. When the degree of a vertex's betweenness and closeness centrality is beyond a certain value, the shape of this vertex would be square. The goal is to find out some key concepts in the field of EM. These key concepts are likely to be the important nodes that connect with other research topics.

Through the above steps, a network constituted by the keywords representing the relationship between them is demonstrated in Fig. 1.

Figure 1 shows that computing methodology, industrial engineering, project management, and information technology are key concepts, which are the



**Fig. 1** Research topics in EM for the Eighth ICMSEM

important nodes connected with other research topics. In other words, they are key issues about EM in the accepted 69 papers in this volume.

In this volume, the proceedings concentrate on computing methodology, industrial engineering, project management, and information technology. To begin with, computing methodology is the theoretical foundation of solving the problems in management science and engineering management. In this part, Mehrbod et al. develop a vector space model to measure the similarity ratio of providers' e-catalogs with a buyer's e-catalog. Gen et al. concern with the design of multi-objective genetic algorithms (MOGAs) to solve a variety of manufacturing scheduling problems. He et al. propose an improved particle swarm optimization algorithm (IPSO) to prevent premature convergence and applied the IPSO to estimate the implied volatility for European option, which is a critical parameter in option pricing. Xiao et al. combine multiple classifiers ensemble technique, self-organizing data mining with cost-sensitive learning, and proposed one-step classifier ensemble model for imbalance data (OCEMI). Deng and Sun study the multiobjective dynamic programming in its investment system to improve the biogas energy development structure.

Project Management, Part VI, is the discipline of planning, organizing, securing, and managing resources to bring about the successful completion of specific project goals and objectives. Scholars in this section tend to focus on the accomplishment of desired goals and objectives by using restricted resources efficiently and effectively. Reis et al. present a methodology developed at LNEC for forecasting and early warning of wave overtopping in ports/coastal areas to prevent emergency situations and support their management and the long-term planning of interventions in the study area. Nazam et al. develop an evaluation model based on fuzzy set theory, analytical hierarchy process (AHP), and the technique for order performance by similarity to ideal solution (TOPSIS) methods for project bidding selection. Li et al. come up with the project management and technical scheme of the reinforced widening embankment with no extra land

acquisition by keeping in line with the framework of conservative traffic and introducing the integrated management approach. Liang et al. propose a classified and graded safety management method for elevator users by combining both probabilities and consequences of accidents based on the coordination theory.

Part VII is Industrial Engineering. Industrial engineering is the branch of engineering which deals with the optimization of complex processes or systems. In this part, Maleki and Machado employ Bayesian Network (BN) and Analytic Network Process (ANP) to quantify mutual correlations between supply chain practices and customer values, and this approach is applied to a case study in the food industry to present its application in practice. Molina et al. present the analysis of this problem (contradictions) and the design of a noise filtration system based on Theory of Inventive Problem Solving (TRIZ). TRIZ has the potential to aid in the creation of innovative systems. Li et al. examine how human capital investment (including education and training investment) affects the firm performance. The results show that employees' educational level has a significantly positive impact on firm performance. Chen and Zhang develop a two-stage model to obtain a proactive and reactive schedule in resource-constrained project scheduling problems (RCPSp) under uncertainty, by testing the example, the effectiveness of the proposed model and approach is validated by the computation results.

Information technology (IT), the last part, is an appropriate technical platform for solving practical management problems, and is defined as "the study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware," according to the Information Technology Association of America. IT is playing an increasingly dominant part in modern society. Azevedo et al. present a case study about the experience of three hospitals and one RFID technology provider to highlight the main architectural characteristics, functionality, and advantages associated with the RFID deployment. Cavaco and Machado provide a model for the creation of competitive advantage that integrates the principles of sustainability (triple bottom line) and the concepts of resilience and innovation. Luo and Amberg identify a set of dimensions of culture from the most known culture theories through quantitative and inductive analysis to form a research framework of culture and a classification of cultural impacts on information technology, which provides an agenda for systematically researching the cultural impacts on information technology. Xiang et al. develop guiding thoughts of all round evaluation and principles, and then established a fuzzy synthetic performance evaluation model based on realizing the performances achieved by the strategic alliances of technological innovation. Xu and Wu propose a large group of decision-making method, which is based on fuzzy preference dynamic information interaction given that the traditional fuzzy group decision-making model does not take the process of information interaction into consideration.

Except for high-quality proceedings, the conference also provides a suitable environment for discussions and exchanges of research ideas among participants during its well-organized conference. Although we present our research results in

technical sessions and participate in round table discussions during the conference period, we will have extra and fruitful occasions to exchange research ideas with colleagues in this relaxed and enjoyable atmosphere of sightseeing.

We would like to take this opportunity to thank all the participants who have worked hard to make this conference a success. We appreciate the help from Universidade Nova de Lisboa and Sichuan University in conference organization. We also appreciate Springer-Verlag London for the wonderful publication of the proceedings. We are also grateful to Rector António Manuel Bensabat Rendas for being the General Chair and Prof. Fernando Santana for being the Local Arrangement Committee Chair. Besides, we appreciate the great support from all members of the Organizing Committee, Local Arrangement Committee, and Program Committee as well as all participants who have worked hard to make this conference a success. Finally, we also want to appreciate all the authors for their excellent papers in this conference. Due to these excellent papers, ISMSEM Advancement Prize for MSEM will be awarded again at the conference for the papers that describe a practical application of Management Science and Engineering Management. The Ninth International Conference on Management Science and Engineering Management will be hosted by Karlsruhe Service Research Institute (KSRI), Karlsruhe Institute of Technology, Germany in July, 2015. Prof. Dr. Stefan Nickel will be the Organizing Committee Chair for 2015 ICMSEM. We sincerely hope that you can submit your new findings on MSEM and share your ideas in Germany.

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