Editorial

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Biographical notes: Rafikul Islam received his MSc in Applied Mathematics from the University of Calcutta in 1988. Subsequently, he obtained his PhD in Operations Research from the Indian Institute of Technology, Kharagpur in 1996. Presently, he is working as a Professor at the Department of Business Administration, International Islamic University Malaysia. In 2013, he was the Chairman of the Organizing Committee of the Twelfth International Symposium on the Analytic Hierarchy Process, held in Kuala Lumpur. He is a recipient of Best Researcher Award at the faculty level and Quality Research Award at the university level. He has published about 50 research papers in international referred journals. His research areas include multiple criteria decision making, operations and quality management.

Min-Suk Yoon is working for Chonnam National University in S. Korea as the Dean of Culture and Social Sciences College and worked as the President of the Korea Society of Information Strategy. He received his PhD in 1997, MBA and BA degrees from the Korea University with major in Management Science and Information Systems of Business Administration. He received the Best Paper Award at the 8th ISAHP 2005. He visited University of Pittsburgh in USA as a scholar in 2011 and delivered invited speech at the 3rd Japanese Symposium on the AHP in 2012. He has researched on multi-criteria decision making including analytic hierarchy/network process, business strategy evaluation, and software development and quality management.

Development of the analytic hierarchy process or AHP in 1977 by Professor Thomas L. Saaty is considered as a breakthrough in the field of multiple criteria decision making (MCDM). Making decisions is a common task in almost all spheres of human life. People have continuously developed tools and methods to deal with growing complexities of decision-making problems. In general, decision-making problems involve quantitative as well as qualitative criteria. Many methods are available which can process quantitative criteria, but not many tools exist that can effectively deal with qualitative factors. Arguably, the popularity of AHP is due to its ability in converting intangibles into

tangible measures in a meaningful and acceptable way. The entire AHP application process is simple and straight forward, its software are user-friendly, in particular, the AHP software Superdecision is free of charge. Unlike many other AHP software, Superdecision can be used for both AHP and analytic network process (ANP, a generalisation of AHP) applications.

Ever since its introduction as a selection or prioritisation tool, AHP has been applied in business and systems research extensively. The method has been applied in almost all branches of business and management. Some specific areas where AHP has been applied are strategic management, human resource management, marketing, operations and quality management, information systems management, environmental management and so on. The present special issue is exclusively devoted to applications of AHP and ANP in business and systems. The readers will find the applications of AHP and ANP in the areas of healthcare, telecom and mobile communication, manufacturing and logistics, information systems, energy, education, etc.

AHP has been applied in addressing various issues related to medicine and healthcare industry. Gould, Krishna, Khan, and Saltzman have shown how AHP can facilitate to incorporate clinical knowledge and experience in evaluating certain drug development projects. The research findings are claimed to help overcome the existing limitations on the issue dealt in the paper. In another study on healthcare sector, Peregrin and Jablonsky applied AHP to select the appropriate equipment in electrocardiography. Output quality, integrated diagnostics are found to be the main criteria to choose the best equipment. Any healthcare organisation invests a considerable amount of money in purchasing its necessary equipment. Therefore, prudent decision on selecting the appropriate equipment is an important one. The present application has shown, once again, the applicability of AHP in healthcare sector. In another paper, Merola, Padoano, and Zuliani applied AHP to investigate the possibility of outsourcing for sterilisation services of a hospital. The authors found that some part of the process can be carried out by the hospital, where as others can be outsourced conveniently. According to the authors, the proposed method can be extended to deal with similar problems by other hospitals but the criteria framework should be refined and validated.

Chaudhary and Uprety have applied fuzzy-AHP to prioritise service quality dimensions in telecom sector in the state of Jammu and Kashmir of India. The specific objective was to identify the factors that can boost the level of quality in this public sector. Among others, the analysis shows that customers' grievance handling has direct and significant impact on the quality of the services provided. To deal with the research problem, the authors combined AHP with other methods, such as fuzzy extent analysis, factor analysis and regression. Eraslan, İç, and Yurdakul used ANP and TOPSIS-based Taguchi method to examine the usability criteria for touch screen mobile devices in Turkish market. The authors found that HTC provided the most usable features compared to iPhone, Samsung and Nokia devices. Ironically, none of the devices could satisfy even half of the customer expectation levels. Therefore, according to the authors, a new design of cell phones is strongly recommended. The study findings can help touch screen mobile phone designers focus on the usability features that contribute most in fulfilling user needs.

Outsourcing logistics activities is a common across many manufacturing companies, as it helps reduce their operating costs. There are many logistics services providers in the market, whom the authors (Verma, Koul, and Pai) called third party logistics providers or 3PLs. The main objective of their paper was to develop a quantitative framework to help

logistics providers identify, choose and prioritise their business development approaches. The main outcome of using the tool is identifying critical decision-making factors that can propel their logistics functions efficiently. In the next paper, Cabrita and Frade's study focuses on supplier selection process which is an important activity of a firm's purchasing decision among the issues of supply chain management (SCM). The author proposes a multi-criteria optimisation approach combining AHP with risk sensitivity analysis (RSA) during selection of the suppliers. The hybrid approach is applied to a real industry case, where supplier risk analysis is used as a complement to the multi-criteria analysis. The analysis shows that the AHP-RSA method performs well for supplier selection with respect to the restricted supplier selection criteria. The result can help practitioners address the missing link between the supplier selection and supply risk management.

Ocampo and Promentilla have used ANP to develop a sustainable manufacturing strategy. ANP has been used due to the existence of a multitude of components that interact among themselves. A Monte Carlo simulation has also been carried to check the stability of the results. According to the authors, the proposed model will address both competitiveness and sustainability in manufacturing sector. Further, the results are innovative and will stimulate more researches in the area. Occupational accidents can negatively affect productivity and competitiveness of industrial firms. Gnoni, Duraccio, and Iavagnilio proposed a method to effectively assess faulty behaviour risk (FBR) at workplace and also aimed to support the continuous improvement process required by current standards. The tool applies a fuzzy AHP-based approach to characterise FBR under the influence of technical and organisational criteria. A test case is proposed to validate the approach. Obtained results will allow safety managers and researchers identify quantitatively the impacts on the overall risk level at workplaces.

Due to diminutive supply of petroleum diesel, in Vietnam, biodiesel has been proposed as a viable alternative. It can be produced by jatropha oil or fish fat or cooking oil. Khang, Promentilla, Tan, Abe, Tuan, and Razon had the research question: which one among these sources was the most effective to produce biodiesel in Vietnam? AHP has been used to evaluate these three options using economic, environmental, technological and social factors. Views were sought from academics, heads of biodiesel projects, managers and engineers of Petrovietnam Corporation. At the end, cooking oil was found to be the most preferred feedstock to produce biodiesel in Vietnam.

Simulation method is widely used in practice, particularly, when analytic methods are not applicable. To run simulation, many software tools are available. Ayag's paper deals with the issue of selecting a suitable simulation software. The author used ANP integrated with alpha-cut fuzzy logic to select the software. He claims the proposed method will reduce a great deal of burden in choosing a suitable simulation software.

Over the last five decades, operations research (OR) tools have been instrumental in improving companies' efficiency and productivity. In particular, OR tools are found to be very useful in optimal usage of companies' scarce resources, such as raw materials, human resource or operating machineries. However, adoption of OR tools are mainly confined within larger companies as smaller companies may not afford to use those due to the necessity of required expertise. Lai et al.'s research have been based upon this question – what are the factors behind adoption of OR tools by various companies? The author's finding is that it is not the cost of adoption, rather it is more dictated by company image and human resource competency.

This special issue also contains one benefit-opportunity-cost-risk (BOCR) application of AHP. Mu used AHP to teach BOCR to graduate management students using the principle of experiential learning. The main objective was to prioritise a number of projects collaborated by university and a relevant international body. According to the author, usage of AHP models as an experiential learning tool has been proved to be successful. In Brazil, furniture selection process is an important issue for a higher education institution (HEI). The study conducted by Salomon, Alonso, and Marins presents how a HEI applied multi-criteria decision analysis to standardise furniture for its classrooms. AHP is applied and the original structuring model of BOCRs is adapted. The use of four criteria requiring different types of information (two qualitative criteria and two quantitative criteria) enhances the learning of MCDA, which is a major contribution of this study.

We hope that the readers of this special issue will find the articles interesting and useful. The opinions expressed in the articles are respective authors'. But any feedback on the articles will be gratefully received. We thank the Editor-in-Chief of *IJBSR*, Professor Jason C.H. Chen for giving us the opportunity to edit this issue and helping us in many ways. We are also thankful to Inderscience and all the staff involved in bringing out this special issue in realty. Due appreciation also goes to all the reviewers of the articles published in this issue. Last but not least, the authors are appreciated for their valuable contributions in this special issue.