EDITORIAL PREFACE

Making Data-Driven Discerning Decision with Business Analytics

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We are currently facing and witnessing a new age, which is characterized as being highly data-driven (“Big Data”). While data is the driver and motivator of business analytics research and practice, these developments pose huge challenges, present new opportunities, and result in a need to employ numerous techniques in order to manage the increasing amount of data which are available to businesses today (Davenport & Harris, 2007; Evans, 2013). Business Analytics consists of four overlapping areas: Data Mining, Business Process Optimization, Applied Business Statistics, and Business Intelligence/Information systems. These four areas as a whole focus on developing new insights and understanding into business performance, as a result of using different methods and techniques. These approaches have been recognized by organizations for their potential value and are considered to be the new path towards transforming insights into action (Wang, 2014).

“It’s a revolution,” says Gary King, director of Harvard’s Institute for Quantitative Social Science. “We’re really just getting under way. But the march of quantification, made possible by enormous new sources of data, will sweep through academia, business and government. There is no area that is going to be untouched” (Lohr, 2012).

*International Journal of Business Analytics* (IJBAN) provides the framework to exploit the synergies among traditionally-diverse topics, such as the fields of data mining, quantitative methods, OR/MS, DSS, and so forth, in a more practical, application-driven format. The journal bridges the gap among them and provides tools to allow companies and organizations to make frequent, faster, smarter, data-driven, and real-time decisions.

There are five articles in this glorious inaugural issue that are written by experts in the related areas. In the first paper, Lee, An, Liu, Horesh, Chae, and Zhang apply *Analytics for Smarter Buildings*. Buildings consume about 40% of the total energy in most countries contributing to a significant amount of greenhouse
gas (GHG) emissions and global warming. Therefore, reducing energy consumption in buildings, making buildings more energy efficient and operating buildings in more energy efficient manner are important tasks in today’s world. Analytics can play an important role in assessing energy efficiency of buildings and identifying energy saving opportunities in buildings by modeling and analyzing how energy is consumed in buildings.

The authors did outstanding jobs in this paper introducing a set of analytics that can assist building owners, facility managers, operators and tenants of buildings in assessing, benchmarking, diagnosing, tracking, forecasting, simulating and optimizing energy consumption. The analytics are based on physics, mathematics and statistics models. The authors explains how these models can be used to simulate the impact of possible changes that can be made to buildings on energy consumption, energy costs and GHG emissions, to optimize energy consumption and to provide decision support for making buildings more energy efficient. The authors made a significant contribution to the business analytics community by introducing how systems of differential equations, multivariate regression models, time-series models and mixed integer linear programming can be used in analyzing energy in buildings and identifying energy savings opportunities.

The second paper focusing on Measuring Effectiveness: A DEA Approach under Predetermined Targets. Many mathematical concepts to compare the overall performance of decision making units (DMUs) from a multi criteria point of view focus on the aspect of efficiency. For example, the Data Envelopment Analysis (DEA) approach provides an almost unmanageable number of models to measure (relative) efficiency, underpinning the dominating role of this dimension of performance. Against this background, it is welcomed that Ahn and Neumann address the managerial problem of assessing the (relative) effectiveness of DMUs as another important performance dimension. While efficiency is defined as the attainment of the fundamental goals in relation to the resources used, effectiveness is referred only to the fundamental goals and the degree of their attainment.

For measuring effectiveness from a DEA perspective, Ahn and Neumann propose a practice-oriented approach that keeps managers’ workload low by incorporating information usually available in the context of performance management systems. They present a two-step procedure in the presence of predetermined targets which are to be achieved simultaneously. Based on the well-known traffic light reporting system, the DMUs under consideration are classified into three subsets according to their ability to meet the targets, and a specific calculation method of effectiveness for each of these subsets is developed. The application of the approach to a European pharmacy chain emphasizes how the results can support managerial decision making in several ways. Especially, a complete ranking for the DMUs under consideration within each subset is provided which can be used as basis for an incentive system. The respective effectiveness scores range from below 1 (for relative ineffective DMUs) to above 1 (for those DMUs which over-fulfill the predetermined targets). In summary, Ahn and Neumann present a new approach to measure effectiveness that is not only geared to the requirements of business practice but also outlines an innovative access to the topic of effectiveness measurement in general.

Sasaki examines the Time Lags Related to Past and Current IT Innovations in Japan: An Analysis of ERP, SCM, CRM, and Big Data Trends. Big data trend is expanding throughout the world simultaneously. However, the process of diffusion may not be the same between the United States and Asian countries. In particular, as most big data-related technologies originate in the United States, Asian firms need time to research new technologies. Consequently, a time lag develops. The author tries to measure such geographical time lags between the United States and Japan. Also, he focuses on one more lags: the one between new technological trends and research publication. Empirical research that uses comprehensive data and publication via peer review process causes time lags. This
paper examines these two lags for both past and present IT innovations. The author proposed a new analytical process based on state-space diagrams proposed by Krinder et al. (2005), for visualizing and measuring time lags, and analyzed 1,073 newspaper articles and 473 academic papers published in Japan related to past innovations, as well as 606 newspaper articles from the United States and 385 from Japan related to big data innovation. This paper found that a) academic research lags business trends by 2-3 years for the past trends, and tentatively, b) Japan lags the United States by 7 months for the big data trend.

According to Pazhani and Ravindran, a supply chain consists of a series of stages (e.g. suppliers, manufacturers, distributors, and retailers) that are involved in fulfilling customer demands. A “Forward supply chain” represents all the activities performed in fulfilling the customer demands that include procurement of raw materials, production of intermediate and finished products, and their distribution to end customers. The term “Reverse supply chain” encompasses all the activities involved in collecting a used product from a consumer, reprocessing it to either recover its leftover market value or disposing it. The annual estimate of commercial returns in the United States is over $100 billion, due to its liberal policies that facilitate easy return of used goods by the consumers. Hence, the management of reverse supply chain is also gaining a lot of attention recently.

Given the huge volume of commercial returns in the United States, the authors of this paper have considered commercial returns, which could be potentially recovered by light repair operations or by refurbishing. The authors consider an integrated forward and reverse supply chain which is termed as “Closed loop supply chain”. The authors develop an optimization model for designing the optimal supply chain network with the objective of maximizing the total supply chain profit. The authors show that the overall supply chain profit increases by recycling and refurbishing of returned goods due to a reduction in the raw material cost. The increase in profit is high enough to offset the costs incurred by recycling/refurbishing. The authors also explain the effects of changes in the product return rates of customers and their acceptance of refurbished products on the total supply chain profit.

The paper by Dottore and Zobel provides an important new approach for measuring the complex impacts of a disaster on the economic health of a community. The technique involves analyzing multiple time series of economic indicators to characterize the complex, multi-dimensional nature of community resilience. By considering the changes in these indicator values over time, the effects of the disaster on different aspects of the economy can be assessed more precisely with respect to both the size of the impact and the length of time needed to recover. This greater understanding, in turn, can lead to improved efforts to mitigate against the impacts of future disasters. Dottore and Zobel do an excellent job of introducing various issues associated with using multiple time series of real data to represent disaster resilience by illustrating them in the context of Hurricane Katrina’s impacts on two different gulf coast communities. In particular, their work highlights a number of challenges associated with data analytics in a disaster context. These include limits on both the availability of data and the frequency at which individual data points may be available, as well as potential issues associated with creating a single overall measure to quantify a complex, multi-dimensional concept such as disaster resilience.

The main objective of the IJBAN is to advance the next frontier of decision sciences and provide an international forum for practitioners and researchers in business and governmental organizations—as well as information technology professionals, software developers, and vendors—to exchange, share, and present useful and innovative ideas and work. The journal encourages exploration of different models, methods, processes, and principles in profitable and actionable manners. Business Analytics is commonly viewed from three major perspectives: descriptive, predictive,
and prescriptive. IJBAN is an indispensable resource for practitioners and academics that work in Business Analytics and related fields.

Hopefully, IJBAN, along with the *Int. J. of Information Systems and Supply Chain Management*, the *Int. J. of Information Systems in the Service Sector*, and the *Int. J. of Knowledge-Based Organizations* will be able to ameliorate a manager’s burdens, meet a practitioner’s challenges, explore an executive’s opportunities, and realize an entrepreneur’s dreams.

Together, let’s celebrate the *birth* of IJBAN, nurture its *growth*, contribute to its *strength* and protect its *health*.

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**REFERENCES**


John Wang is a professor in the Department of Information & Operations Management at Montclair State University, USA. Having received a scholarship award, he came to the USA and completed his Ph.D. in operations research from Temple University. He has published over 100 refereed papers and sixteen books. He has also developed several computer software programs based on his research findings. He has served as a guest editor and referee for many highly prestigious journals. His long-term research goal is on the synergy of operations research, data mining and cybernetics.

Bin Zhou is an Assistant Professor of Supply Chain Management in the College of Business, University of Houston-Downtown. He obtained his Ph.D. and MBA in Management Science and Information Technology from Rutgers University. His research interests include operations-supply chain management, information technology, and system optimization. His research work has appeared in many journals and books such as International Journal of Production Economics, European Journal of Operational Research, Annals of Operations Research, International Journal of Applied Decision Sciences, International Journal of Systems Science, International Journal of Management Information Systems. He is an Associate Editor of Decision Analytics and International Journal of Strategic Decision Science.