

Preface

This book is dedicated to decision making theories and practices from analysis to strategy. The book is divided into four sections. In the first section, we present five papers that focus on the conceptual strategy development. The rising levels of environmental uncertainty caused by globalization and digitization has redefined definitions of opportunities and risks and has morphed strategic decision-making into a more complex and high-stake dilemma. While the right strategic choice can return higher payoffs quickly, the wrong ones carry a much higher risk of catastrophe. How can a company nail down the right strategic choice in the midst of this rising uncertainty and ever-increasing risks? The truth is that there is no easy solution.

In the second section, we present five papers that focus on data analysis. “Big Data” are flooding corporate databases at rates never seen before. Some companies are using data to support rigorous business analysis that guides decisions. However, most companies are far from utilizing all the available data and extracting business value from big data. In the early days of corporate management, managers discovered that minimum efficient scale was a key determinant of competitive success. Similarly, future competitive advantage may accrue to companies that can not only capture more and better data but also analyze that data effectively to generate insights. Companies must not only invest in the necessary capabilities to analyze data, they must also understand the long journey that is required to move to a data-driven decision-making culture that is prerequisite to converting analytics into a strategic advantage. Even though every firm can invest in the necessary technology to gather big data, not all companies could absorb the data to create leverage. Failure to embrace this will be costly.

In the third section, we present five papers that focus on data integration. The corporate data to be analyzed often come with different data models, formats, and platforms. In addition, this data could be stored in a variety of databases. A major difficulty is the need to integrate data from multiple sources that are often formatted in incompatible forms or represented with incompatible assumptions. Sometimes data are imprecise, vague, or incomplete. Data integration is the emergence of information from the merging of data from disparate sources with differing conceptual, contextual, and typographical representations.

In the fourth section, we present five papers that focus on practical strategy implementation. Although organizations may formulate excellent strategies, these strategies could easily fade away as the organizations tackle day-to-day operational issues. Companies need formal processes to implement strategies through effective set of priorities and operational improvements.

1. CONCEPTUAL STRATEGY DEVELOPMENT

Zeleny in his paper entitled “Strategy as Action: from Porter to Anti-Porter” argues that decisions are actions and therefore strategy itself is action, not just a description of action. He shows that in traditional strategic decision-making information have replaced action and talk has replaced walk. He starts from the premise that strategy is what company does and one cannot run a company just on information. He shows that customers shape strategy and trigger corporate action. The customer is central to strategic decision-making and without considering the customer there is no workable strategy. This is why he labels the action-based strategic decision-making as “Anti-Porter“. He argues that Customers frame company’s strategic action and determine if products and services add value, provide quality, are innovative or offer tradeoffs-free satisfaction. *Action* and *description of action* are two very different domains and only rarely the two meet. An executive can describe what he intends to do at the board of directors meeting but only what he does is his actual strategy. According to Zeleny, Strategy is a series of interrelated sequential decisions. These sequences are marred by conflicts of tradeoffs, insufficient information, inadequate knowledge and fuzzy language. In order to understand such mitigating circumstances, one has to understand *decision-making*. *Decision making is a function aimed at resolving or dissolving the conflicts of tradeoffs* (Zeleny, 2010). Therefore, a single criterion has no tradeoffs and there is no decision-making with a single criterion. We can move towards decision-making only when facing multiple, non-aggregated criteria (and their tradeoffs). The purpose of strategic decision-making process is either resolving (selecting tradeoffs through compromise) or dissolving (reducing or eliminating tradeoffs conflict). Strategy *emerges* from a series of interrelated decisions aiming towards reducing or eliminating tradeoffs *conflict*. Accumulated *insight* and past experience is the platform for change, *not information* of future intent, mission or vision. Zeleny states that Corporate strategy is *not assembled* into a unified whole like a Lego. Rather, strategy is *developed* and nurtured into existence from the past action – like a living *organism*, not like a manufactured *machine*.

Acar et al. in their paper entitled “Using Decision Sciences to Enhance Entrepreneurial Foresight: The Comprehensive Situation Mapping Approach” introduce an integrated framework that investigates how the thinking and methods of the decision sciences can assist with capturing alertness. They demonstrate that there are many parallels between individual alertness and organization’s entrepreneurial foresight. They show that the very motivation for engaging in enterprising behaviors for individuals it is “self-interest seeking with guile” and for corporations it is “profit-seeking”. Both individual entrepreneurs and organizations are more likely to discover high-quality opportunities when they incorporate their prior experience into the search process. Acar et al. suggest how such entrepreneurial foresight might be developed by organizations dedicated to becoming corporate entrepreneurs. They propose comprehensive situation mapping and show that it offers the possibility to uncover hidden assumptions that firms have with respect to their strategic scenarios. They show that their proposed approach can explore connections between the possible changes in external and internal environments and organizational outcomes, facilitate convergence of multiple perspectives within their constituencies, and identify opportunities that may be profitably exploited. More importantly, they argue that their approach can provide the organization with the timeline for change and prepare the firm for taking advantage of the environmental opportunities. They review the notion of individual alertness that is claimed to be instrumental in the discovery of opportunities. They also review environmental scanning and distinguish between tactical-level and strategic scanning. They conclude with discussing the method’s usefulness, its promise and limitations, and the future directions it might take in the entrepreneurship context.

Davies in his paper entitled “Management Theory: A Systems Perspective on Understanding Management Practice and Management behavior” proposes a systems perspective on the interdependent relationships between management academics, management theory and management practice. He examines matters relating to the development of theory, the assumptions that underpin such development, the impact of theory on practice, and how practice, in turn, may impact theory. He demonstrates that managerial behavior of a “controlling” nature, albeit fostered by negative imagery, may generate expected beneficial consequences in the short term, but would then lead to employee behaviors that fuel and strengthen negative imagery in the long term. That is, the “quick fix” makes the problem worse in the long term. He provides a constructive illustration of the use of the systems representational tools and identifies means of addressing issues of concern to management theorists, analysts and practitioners.

Johnson and Coyle in their paper entitled “Toward Understanding Ethical Decision Making: A Re-defined Measure of Intent to Act Ethically” propose a step-wise methodology for the development of a scale measuring intent-to-act ethically, which is a step forward in the ethical decision-making process. To test the robustness of their methodology, they gather data from 75 students and 181 professionals to ensure reliability in ethical workplace scenarios. Their research is timely and relevant to recent issues such as the current economic crisis lead by the sub-prime banking failures and the failures of Enron and Tyco are extreme examples of failure of societal members to act ethically. Their research fills the gap in business ethics by developing a construct measuring ethical intent. Their construction of scale-measuring items is based on a theory of intent, and issues identified from the human resource management literature related to reasons employees do not report perceived unethical behavior in the workplace. Their results tested for social desirability bias show that the proposed scale offers an improved reliability for assessing behavioral intent related to ethical decision making. Their study provides a potential new tool for research that relies on a measure of ethical intent as a proxy for ethical behavior.

Cheong and Corbitt in their paper entitled “From Childhood Poverty to Catfish: A Conceptual Participatory Modeling Framework for Strategic Decision Making” show that strategic decision makers are frequently faced with unstructured problems that cannot be solved adequately by analytical means and in such situations a better decision making approach is one based on stakeholders’ participation. They discuss participatory modeling whereby participatory methods are used for knowledge elicitation while simulation modeling techniques are used to evaluate strategies in order to determine optimal ones. In this paper, they discuss a participatory modeling framework using agent-based modeling and System Dynamics and they illustrate the use of the framework in two real-life case studies, namely, participatory agent-based modeling of childhood poverty in Vietnam, and participatory System Dynamics modeling of the Vietnamese catfish industry. In the first case study, they create a computer-based model of childhood poverty in Vietnam using a participatory agent-based modeling approach to explore the causes and consequences of childhood poverty, and to evaluate the effects of a range of scenarios and policies that are robust and effective over a wide a range of conditions. Their proposed model helps to develop a deep understanding of the causes, effects and dynamics of childhood poverty in Vietnam. Since their model is computer-based, it is also useful for simulating a wide range of scenarios and policies in view of determining robust policies that are effective over a wide a range of scenarios. In the second case study, they study the development of the Vietnamese catfish supply chain through improved policy formulation and evaluation. They build a model of the catfish supply chain using the System Dynamics modeling technique, a widely accepted approach for modeling complex systems with inherent uncertainties and non-linearities. They use their model to simulate and explore the result of the combined actions of political, economical, social, technological, environmental, and global factors and to evaluate the effect of

a range of scenarios and policies in view of determining effective policies. The scenarios and policies that they simulate are related to: (1) economic sustainability, (2) environmental sustainability and food safety, and (3) rural employment and poverty alleviation.

2. DATA ANALYSIS

Saaty and Tran in their paper entitled “Fuzzy Judgments and Fuzzy Sets” argue that in spite of the popularity of fuzzy set theory, little thought is given to why numbers should be made fuzzy before plunging into the necessary simulations to crank out numbers. Fuzzification does not necessarily improve the numerical value(s) of a solution in those situations when the true value is already estimated by a numerical process. They give three different ways to show that fuzzy should not be used to make decisions because all judgments are not crisp measurements that are subject to fuzzy modification. They believe strongly that fuzziness is the result of human limitations and they have no hidden magic that lies in the manipulation of numbers. In the field of decision-making, the concept of priority is quintessential and how priorities are derived influences the choices made by decision makers. They conclude that the fuzzy approach does not help to approximate more closely to known measurements and can often make its entries worse.

Smith and Nauss in their paper entitled “Investigating Strategic Alternatives for Improving Service in an Inland Waterway Transportation System” demonstrate the value of supporting strategic decision making with a variety of analytical approaches and perspectives. They show how optimizing models are used to obtain insight on the effects of stressing alternative criteria (immediate efficiency versus equity) in a real-life scheduling application. They then illustrate how discrete-event simulation is employed to incorporate stochastic elements and test alternative scheduling mechanisms and infrastructure improvements to examine their effects on the performance of the whole system. They also discuss the extensive set of statistical models used for providing the parameters needed for realistic representation of the system. Finally, they highlight the importance of considering the perspectives and economic interests of industry stakeholders when examining strategic alternatives for improving the system and argue that only by such a comprehensive triangulation of study methods can relevant and reliable results be produced.

Joseph and Mazouz in their paper entitled “Testing for Overreaction and Return Continuations in Stock Price Index Returns” test the stock market response to price shocks and examine (1) whether the magnitude of the shock affects the behavior of the abnormal returns; and (2) whether the choice of the model impacts on the results obtained. The previous research shows that returns are positively related with volatility implying that volatility will impact on the abnormal returns that follow from price shocks. Of course, the stock price might quickly adjust to equilibrium following larger price shocks, such that the evidence supports market efficiency. However, the magnitude of the price shock and the associated degree of volatility might also lead to results that support over-reaction and return continuations. They note however, that prior empirical work that applies different trigger values tends to employ firm-level returns. They show that trigger values of these magnitudes are more likely to generate results that support over-reaction or market efficiency in the case of stock index returns.

Chen et al. in their paper entitled “Overcoming Liability of Foreignness: An Analysis of Early Foreign Investment in China” examine the liability of foreignness faced by multinational enterprises, and the effects of strategies employed to overcome this liability. They conduct a study based on a sample of 3,085 Sino-foreign joint ventures formed in manufacturing sectors in China and find that Hong Kong

investors who are often perceived to have lower liability of foreignness than that of investors from other countries, are more actively engaged in strategies to overcome this liability. More specifically, they show that Hong Kong investors actively adopt strategies to seek local markets, maintain investment flexibility, utilize their competitive advantages in labor-intensive industries, and leverage cooperative synergism to improve their performance while the investors from other countries adopt market seeking and cooperative synergy approach to improve performance. Their study shows that from 1979 through 1992, even though the growth rate is high, the total dollar amount invested in China is relatively small. They suggest that foreign investors during the early days were hesitant about investing in China due to a high level of liability of foreignness. Lack of a sound economic infrastructure and legal system, political instability all contributed to this liability.

Mettler in his paper entitled “Thinking in Terms of Design Decisions When Developing Maturity Models” systematizes the current design knowledge pertaining to the development of theoretically sound and practically useful maturity models. In doing so, he analyzes several popular design methodologies in the literature with respect to common elements of the design process of maturity models. In order to guide model developers in the course of the design process, he illustrates and discusses the most important decisions parameters of each design step. Therewith, and given that no uncriticized standard design methodology for maturity models exists so far, he contributes to a subject matter of design science research, which in practice, because of its complexity, is widely recognized, while it is somehow neglected in research. That said, he acknowledges that the proposed synthesis of a design process for maturity models is limited in that it is only supported by few research experiences. Nevertheless, it is his opinion that it may prove to be useful for practice as well as provide a basis for further research. In order to generalize the findings he propose incorporating experiences from other domains and extensively testing the propositions, for instance by developing own maturity models or by investigating the user’s behavior during the model application. Moreover, he argues that the identification of useful classification criteria for maturity models and the development of a model base will serve practice as well as research.

3. DATA INTEGRATION

Iacovou et al. in their paper entitled “A Comparison of Pairs, Triads and Quads in Multi-Attribute Decision Making” discuss the limitations of pair-wise comparison technique for completing multi-attribute evaluations. They highlight the relatively large number of comparisons and the time needed to complete these comparisons in larger attribute sets as a potential shortfall of the method in multi-attribute decision making. They conduct an experiment to test the efficacy of three alternative approaches for eliciting preferences: pairs, triads and quads. Ninety-three subjects use one of the three approaches to rank the importance of fifteen items. The results indicate that those employing the pair-wise approach take significantly longer than those using either the triad or quad approach. In addition, the triad technique yields more accurate results (compared to the pair and quad methods). They also find that the quad approach generates fewer intransitivities than either the pair-wise or triad approaches. They observe no differences across the three techniques with respect to reliability or perceived ease of use. They conclude that managers and others charged with the responsibility of ranking attributes by groups should move away from the relatively common practice of using pair-wise comparisons for ranking attributes. They recommend that the triad-based approach is superior both in terms of time efficiency and decision quality.

Kendall et al. in their paper entitled “The Impact of Agile Methodologies on the Quality of Information Systems: Factors Shaping Strategic Adoption of Agile Practices” construct a conceptual model and conduct a survey of software developers. Their analysis supports their hypotheses about the importance of the strategic selection of a development methodology. They conclude that practicing project managers should consider the decision to use certain methodologies as part of the strategic process. Their focus is on the relationship between adoption of the agile methodology to perceived software quality. Given the importance of the decision to adopt agile methods, they question whether or not decision should be made on the strategic level by a project manager responsible for the overall quality of the project. They also explored the factors affecting the quality of software. Their study confirms that the use of agile methodology first affects internal performance, and then indirectly affects the quality of the systems product. They observe that the relationship between the product quality improvement and degree of use is not statistically significant. However, the relationship between the process quality consequences and the degree of use is statistically significant. This finding suggests that the use of systems development methodology directly affects the quality of the process and indirectly influences the quality of the product. They conclude that the selection of methodology is important and should be part of the strategic decision-making process that a project manager goes through prior to starting a new project. It is assumed by those who practice agile methods that an agile approach is often more beneficial than using traditional methods. Until now, little has been done to demonstrate the effectiveness of agile practices. Kendall et al. show empirically that individual and team performance, as well as perceived quality of the information can benefit from agile modeling.

Pita et al. in their paper entitled “Strategic Information Systems Planning (SISP): An Empirical Evaluation of Adoption of Formal Approaches to SISP in Australian Organizations” argue that within the Information Technology/Information System (IT/IS) landscape, theoretical research is well advanced but in many aspects still lags behind practical needs as Strategic Information Systems Planning (SISP) is addressed by many theorists but few practitioners. They show that the content of the relations among SISP constructs still remains hidden because of the conceptual nature of previous SISP studies, further diminishing the impact of academic thinking on SISP practice. Consequently, a question about theoretical relevance as a source of practical advice to SISP practitioners can be raised. In their paper, Pita et al. focus on questions such as: How deep is the gap between SISP practice and theory? Can analysis of current relationships between different approaches and SISP success explain why SISP is still one of the major concerns for IT executives? Should similar organizations exercise similar approaches to SISP? Do organizations’ objectives and their size have an influence on the selection of a SISP approach? In order to answer these questions, they focus on empirical analysis of diffusion and adoption of the five SISP approaches, namely, Business-Led, Method-Driven, Administrative, Technological, and Organizational, as well as their current relationship to SISP objectives, company size and SISP success. They find that a combination of SISP approaches is always more successful than the implementation of any one approach and direct future theoretical efforts to unification of all five SISP approaches into one approach which will integrate the practical elements of each approach, as it happens in practice.

Sarojini et al. in their paper entitled “A Hybrid Multiple Criteria Decision Making Technique for Prioritizing Equipments” argue that prioritization of equipments is an important factor for maintenance decision making to optimize maintenance management in reliability centered maintenance. The demonstrate that there are many factors to be considered as part of the prioritization of equipments for maintenance activities. Consequently evaluation procedures involve several objectives and it is often necessary to compromise among possibly conflicting tangible and intangible factors. For these reasons,

they propose multiple criteria decision making as a useful approach to solve this kind of problem. In their study, a hybrid model is developed for prioritizing the equipments in hybrid flow systems. The first stage of their model involves identifying the criteria. The second stage is to prioritize the different criteria using fuzzy analytical network process, in which the weight of each criterion is calculated using modified fuzzy logarithmic least square method to overcome the criticism of inconsistency, unbalanced scale of judgments, uncertainty and imprecision in the pair-wise comparison process. They finally rank the equipments with fuzzy technique for order preference by similarity to ideal solution. They conclude that their proposed method is practical for ranking critical equipment in hybrid flow systems in terms of their overall performance with respect to multiple interdependence criteria.

Wareing in his paper entitled “Demonstrating and Communicating the Value of Nuclear Decommissioning to Society” argues that for most government organizations such as those associated with health and education it is relatively easy for the government and the general public to see what they get for their money since these spending generates physical assets and improved services. However, in the case of nuclear decommissioning, the value and benefits of what is being done are far less tangible since the general public has already received the apparent benefits from these spending in terms of electricity generation or enhanced security, and therefore all that is seen is the cost. The true benefits of decommissioning are more abstract since if the job is done right, general public will never see the risks realized or experience the associated detriment. Therefore the challenge for the nuclear decommissioning authority is how to quantify the avoidance of societal harm in a consistent way that supports decision making but also takes account of the negative impacts of the decommissioning activities. To secure government funding and demonstrate that the nuclear decommissioning authority is delivering its mission, it must be able to show that it provides value for money for its stakeholders. Wareing discuss the Value Framework Concept and show that value comes in many forms such as an improved environment, hazard reduction, changes in sky line, social amenities, money, and employment. The Value Framework Concept provides a consistent approach to measuring value that is broadly acceptable to stakeholders, allows different aspects to be compared, and decisions made on a national basis. He argues that depending on the perspective of the receiver, and their closeness to the affected area, the weighting placed on the different aspects of value will vary.

4. PRACTICAL STRATEGY IMPLEMENTATION

Sun in his paper entitled “Linear Programming Approaches for Multiple-Class Discriminant and Classification Analysis” propose a novel and powerful linear programming approach for multiple-class discriminant and classification analysis. The proposed approach is purely algorithmic and does not require any ad hoc or trial judgment on the user’s side. The new model minimizes the sum of the classification errors. This model has desirable properties of being versatile and immune to the pathologies of some of the earlier mathematical programming models for two-class classification. The proposed model can be used as the basis to develop other discrimination and classification models including multiple-class support vector machine and mixed integer programming models. The results on standard and randomly generated test datasets show that the proposed method is very effective in generating powerful discriminant functions.

Çómez et al. in their paper entitled “Meeting Correlated Spare Part Demands with Optimal Transshipments” focus on the importance of after-sales service for improving the overall experience of existing customers and to boost purchase intentions of new customers. They study spare part transshipments

which are used to reduce severity of part stock outs between two service part facilities whose demands are correlated. They show that the optimal transshipment policy is an inventory hold-back type. In other words, a transshipment request made for that part by a stocked out retailer is rejected if the part inventory at a facility is less than or equal to its hold-back level. The hold-back levels increase towards the next replenishment of parts. This implies that transshipment requests are initially accepted until a critical time and afterwards they are rejected. They proposed a model using this critical time as the single decision variable. They show the simplicity of hold-back level calculations. They also show that once these levels are communicated to the service part facilities, the implementation is easy and does not require real time managerial oversight. They advocate for the use of the optimal transshipment policy since the computation of hold-back levels and implementation of the optimal transshipments require limited resources and very little oversight.

Laporte in his paper entitled “The Traveling Salesman Problem, the Vehicle Routing Problem, and Their Impact on Combinatorial Optimization” study two of the most popular problems in the field of combinatorial optimization, namely, the Traveling Salesman Problem and the Vehicle Routing Problem. He shows how their study has fostered the development of some of the most popular algorithms (i.e., exact algorithms, classical heuristics and metaheuristics) now applied to the solution of combinatorial optimization problems.

Lin et al. in their paper entitled “Identifying Critical Success Factors for Supply Chain Excellence” present a research framework for studying supply chain excellence which emphasizes two distinct paths of knowledge acquisition: qualitative inquiry through interviews with senior supply chain executives, and quantitative inquiry through data collection. Their study is among the first group of studies to use a two-stage research methodology to investigate critical factors/concepts of supply chain management. They consider four factors in this study through the literature review as the antecedents of supply chain excellence: collaboration, organizational conditions, technology adoption, and operations. They use the grounded theory approach to further understand those four critical factors and relevant concepts. They show that organizational condition is ranked as the most important factor by the senior supply chain executives. They also assess the effect of four critical factors on organizational performance through regression analysis.

Ajmal in his paper entitled “Knowledge Sharing in Supply Chain” develops analytical models to minimize knowledge sharing uncertainty. He uses some analogies from thermodynamics to describe the phenomenon in supply chain knowledge sharing. His study finds that distance and sender capacity are important to reduce knowledge sharing uncertainty. He shows that higher contact frequency between the sender and the receiver without considering sender capacity is proven to be insignificant to reduce knowledge sharing uncertainty. He demonstrate that the proposed mechanism provides a new approach to explicate knowledge sharing in supply networks, provides deep-rooted opening point for supplementary empirical assessment, and facilitates managers expand their understanding of composite circumstances embedded into global supply networks to share their knowledge. Ajmal summarizes the main implications of his research as: First, minimizing knowledge sharing entropy benefits the increasing of knowledge loss in network. Second, it is important to setup distance between transmitter and knowledge receiver at the initial stage of knowledge sharing process. Third, the frequency of communication between the sender and the receiver does not give any influence to the success level of knowledge sharing.

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