From the Editor:

Keeping Connected

Did you know that the IFORS News first appeared in June 2007? It was an effort to make sure that we keep connected, since I believed then, as now, that constant communication is an important element in strengthening the professional bonds among societies, regional groupings, and IFORS.

On the way to its 7th year, IFORS News requested for IFORS Correspondent volunteers in order to hear from societies on a more regular basis, and not miss important events and developments. The names you see in the Editorial Box, henceforth, shall be the OR global community’s local eyes and ears in the areas where there are OR Societies. Welcome to our IFORS Correspondents, and I hope to see the family grow some more!

We surely have kept connected in this issue, where we see accounts of conferences in Greece, Philippines, South Africa, Senegal, Russia, Ukraine and Germany. In this issue too, we read about OR societies linking up with each other (China and Germany), and OR communities thinking about (Senegal) and re-thinking the format (Russia) of their OR organizations.

We also witness efforts at making sure that the OR talent pipeline is full, as we see the Summer Schools in Valencia, Spain and Kiev, Ukraine. One just has to go over this issue to find out why the youth would be enamored with the discipline. Our Tutorial Section demonstrates the continuing contribution of OR to the field of Biomedicine while the OR Impact article shows how it has helped farmers. As if this is not enough, the Feature on OR linked to the political decision making in China should convince the reader of how interdisciplinary and broad the discipline is! We are, moreover, at an exciting time, as we find ourselves in the forefront of Analytics (Book Review) – with a national society that has incorporated Analytics to its name (OR Society in Focus)!

Together with the national, regional and international events as well as recent OR developments and tutorials, IFORS activities form an important part of each IFORS News. In this issue, one sees that OR for Development is a key initiative that has seen a lot of activities in the past year. This issue reports on the outreach program to support a speaker to a developing country conference, as well as its sponsorships of the ICORD, the IFORS Prize and on line resources.

If IFORS News was first published in 2007, who was its first editor? Yes, it’s trivia time, and we have prepared other questions for you to discover your IFORS Trivia IQ. Don’t worry, the answers are in the same issue and in the website as well. As they say, it pays to keep connected!

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Political Decision Making Processes in China and OR Support

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Preface

In his preface for the newly launched Journal of the Operations Research Society of China (ORSC), Yuan says: “Problems and difficulties crop up in optimization and decision making when we try to do dynamic reformations... In solution of the complicated problems, traditional theories and methodologies of operations research and management science prove to be less useful. We have to find new way out. We need to better understand the backgrounds and nature of the intrinsic system. We endeavor to develop new theories, methodologies and modeling approaches”. This article explains the political decision making processes in China, which differ from those in the West, and gives initial hints on how OR methodologies and approaches could be used to foster a sustainable development path, long-term thinking and planning.

The most powerful institution within China’s political decision process is the State Council, dominated by the Chinese Communist Party (CCP). It “exercises unified leadership over local state administrative organs at various levels throughout the country, regulates the specific division of power and functions of the state administrative organs at the central level and the provincial, autonomous regional and municipal level” (CIIC).

In the tradition of Communist Central Planning, China uses Five-Year Plans as an instrument for political guidance. After 20 years of high growth (rates of 10-17% p.a.), the economy has reached the decade of optimization and sustainability. The current 12th Five-Year-Plan for 2011 to 2015 focuses on economic restructuring with environmental and social goals playing a major role. The government no longer plans production volumes and economic aggregates but gives companies of non-strategic sectors far-reaching freedom to decide how to act on the markets (Reisach 2007: pp.209). As a consequence, most OR scientists in China are now engaged in the optimization of corporate processes. However, there is still room for OR in complex political decision processes.

For significant decision-making, the CCP often starts a first initiative through its powerful party schools where every high ranking official has to undergo regular training. But contrary to common assumptions in the West, decision making does not take place in an authoritarian way, but in a rather complex process of consensus building and collective decision making (Dumbaugh and Martin:2, Sun:9,26).

This helps to “maintain social order through a harmony-within-hierarchy arrangement” (Martinsons: 8). The more important the issue, the broader the discussion (Sun: 6). This also explains why the right wording, i.e., “non-state” sector instead of “private” sector, plays a major role in gaining consensus, and why progress can be reached even when formulations sound unfamiliar and vague for Westerners.

The decision process is better understood by referring to Chinese history, thinking styles and culture. Von Senger refers to the ancient military tradition of “Moulüe”, “supraplanning”, which goes beyond Western strategic planning level, and has very long time dimensions (von Senger 2009:2, 2013:66). This view is supported by the official political thinking that China is in the primary stage of socialism and will remain so for a long time, for more than a hundred years.

For decision-making, China uses a complex method of gathering opinions and experimentation.

Political top leaders, as a kind of basic research and visible representation of their proximity to ordinary citizens, conduct annual field trips and inspections across the nation to gather insights and opinions. But it has to be considered that in the presence of authorities, normal citizens might not say what they really think. Therefore, more insights can be gained if their opinion is gathered by people they trust and who know how to interpret, formulate and channel those views to the decision makers.

One of the important institutions in the opinion gathering and channeling for internal policies is the Chinese People’s Political Consultative Conference (CPPCC). Its significance has been widely underestimated in American research on Chinese political decision making processes since those studies mainly focus on military and foreign affairs issues (see Cabestan, Dumbaugh and Martin, Sun). CPPCC is “an important institution of multi-party cooperation and political consultation under the leadership of the Communist Party of China, a major form for carrying forward socialist democracy in the political life of the country” (NC CPPCC).

The CPPCC is pooling “wisdom from various sources” in order to “accelerate the process of putting major state decision-making on a more scientific and democratic basis” (NC CPPCC, Art. 2). Its members are tasked with “proactively offering constructive opinions to leading organs of the Party and government”; they are invited to “free airing of views” (NC CPPCC, Art. 5). They collect opinions, suggestions and channel these back to the official discussion process. In Western terms, this method could be interpreted as a kind of indirect stakeholder research. It follows the tradition of holistic thinking in Chinese culture which connects different factors and perspectives (Reisach et al. 2007: pp.344).
Even decisions which sound like contradictions in Western ears, such as “the decisive role of the market”, combined with the “leading role of state owned enterprises”, as communicated in the Communist Party Committees reforms decision of November 9-12, 2013, are quite typical for yin-yang thinking and progress through overcoming antipodes in communism.

Experimentation is another important feature of China’s decision-making. Chinese like to see new things work in practice and rely on their experience rather than on theories (Norenzayan et al.: pp. 653-684; Reisach et al. 2007:pp.197). They consider the context of every decision to be taken and see their development as unique. In order to avoid bigger risks, new models are implemented only after the successful completion of pilot projects in selected sectors and locations. Since there is no reliable information on contextual facts and future development available (Volz and Gigerenzer :1), it makes sense to apply this kind of strategy as a “learning by doing” tool.

This method has been successfully used in trade liberalization and will again be used to further open up the capital market, start up and innovation financing, as announced mid 2013 for the new free trade zone to be established in Pudong, Shanghai. At the same time, China does not depend on one nation, partner or technology but always keeps alternative paths open. On going projects with different partners (Reisach et al. 2007:pp.91) and under various circumstances help decision makers develop an adaptive toolbox of heuristics and make decisions based on ecological rationality (Reisach 2008:110; Volz and Gigerenzer:2, Gigerenzer and Gaissmaier: 457).

Decisions under uncertainty and lack of reliable data

The decision processes explained above are typical for decisions under uncertainty. Framework conditions in China are complex and rapidly changing. Assumptions would be based on aggregated data from provincial and local authorities, which might not always reflect reality. The successful adherence to predefined performance goals is linked to promotion of the reporting bodies. Therefore officials involved are inclined to report (over) fulfillment of duties rather than deficiencies (Reisach et al. 2007:39, Sun:23). This reinforces the common pattern in Chinese culture that knowledge transferred through a trustworthy person is more reliable than information in official documents (Reisach et al.: pp. 369).

Governmental think tanks such as the Chinese Academy of Sciences (CAS) and the Chinese Academy of Social Sciences (CASS) as well as semi-government think tanks, professional scholars and experts provide suggestions and policy consultancy in their research and reports. But during several rounds of screening and review at the party committees and senior leader’s offices, their precious findings and recommendations sometimes do not get the deserved attention. Sun (15) quotes the representative of a prominent Chinese think tank: “I am a producer of information. The senior leaders are my customers, and their written comments/instructions are the purpose of my existence.” With this deep deference to superiors (Reisach et al. 2007:pp. 352, pp. 404), researchers will rarely come up with innovative ideas. This is where independent research institutions and agencies, independent funding and/or a cooperation of local institutions with international partners could strengthen the quality of data and the impact of their research.

Implementation of political decisions: Current status and suggestions

In most fields, China has well-formulated laws and a sufficient (sometimes very high) number of regulations in place. But they are weakly monitored or reinforced (Wacker and Kaiser: 14). Due to the lack of independent NGOs, failures are seldom brought to light. Governmental agencies and local administrations draft documents rather than launch initiatives or investigations. They often suffer from lack of personnel (Wacker and Kaiser: 14) and desperately need backing from local authorities if they want plans implemented successfully. The OECD therefore suggests better coordination of national, provincial and local authorities to implement planned policies (OECD:85). Additionally, openness and credibility of reports could be encouraged through incentivizing a critical review of data and initiatives instead of mere plan fulfillment. When problems, such as air and water pollution that bring immediate health consequences become public, public demands intensify and are multiplied through social media. Therefore, decision making needs an increasingly cautious and scientific approach to avoid mistakes (Lü).

OR instruments are mainly applied for business and technical optimization. But OR offers a broad variety of approaches like MCDA, project management and scheduling, OR and Ethics, OR for Development, OR and Methods of Societal Complexity which can support political decision making, problem structuring and process optimization. The CASS already studied methods of societal complexity research like the Compram model (DeTombe) in the 90s. A broader stakeholder dialogue and active involvement in the process of problem structuring and gathering of ideas might improve learning effects and outcomes. It would make people aware that good citizenship is not only dutiful obedience to rules and orders from above, but rather a collective and effective effort in the process of problem definition and change which is essential for their long-term societal wellbeing.

Qualitative methods, aiming at large and uncertain societal developments, should be adapted to Chinese culture (thinking patterns, communication and leadership style, problem-solving strategies, values) and local circumstances. Colleagues from ORSC are welcome to further discuss such issues in the session “Intercultural Aspects of OR” in the forthcoming IFORS Conference in Barcelona.

Bibliography


Optimization and Data Analysis Algorithms in Biomedicine

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Introduction. Biomedicine is a field that has profited greatly from advances in engineering and analytics tools such as optimization and data analysis algorithms. In the last few years, interdisciplinary efforts of scientists from diverse fields such as medicine, engineering, operations research and statistics have resulted in significant scientific medical achievements such as production and analysis of genome data, new drugs, and modern medical devices such as fMRI tomography, laser surgery, and brain-machine interfaces.

Network optimization has been used in studying brain dynamics, maximum clique algorithms for drug design, optimization algorithms to define cancer treatment by radiation, and data mining algorithms to discover biomarkers. These are but a few instances of biomedical sciences and operations research working together, bringing forth the new disciplines of Bioinformatics and Medical Informatics.

This report briefly describes our recent work on Raman spectroscopy and data mining for cancer research and network tools in studying the Parkinson brain. More details can be found in the references cited.

Raman spectroscopy and cancer research. Recent advances in Raman spectroscopy have attracted interest in biomedical applications of the technology, particularly in the field of oncology. Raman spectroscopy has demonstrated the potential to significantly aid in the research, diagnosis and treatment of various cancers. Raman spectroscopic analysis of biological specimens is advantageous as it provides a spectral fingerprint rich in molecular compositional information without disrupting the biological environment, thus allowing in-situ biochemical observations. The focus of this research is to develop a robust data analysis framework for evaluating and characterizing five commonly used breast cell lines for therapy development and breast cancer research. The framework must be able to classify cell types based on cell-line specific spectral features, which may ultimately allow for the potential discovery of Raman-based spectral biomarkers for identifying cancer and tumor sub-types.

Data Collection. Raman spectra of five breast cell lines MCF7, BT474, MDA-MB-231 (cancer cell lines) and MCF10A, MCF12A (non-cancer cell lines) are collected by Renishaw 2000 InVia Spectrometer System coupled to a Leica microscope with a 63x water-immersion objective (NA. 0.90). 25-40 spectra were collected from each cell line and the average spectra for all the cell lines are shown in Fig. 1.

Figure 1: The average spectra of all five cell lines


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