YIRCoF '11
Yeditepe International Research Conference on Foresight and Futures

August 24 - 26, 2011, Istanbul

"Theory Building in Foresight and Futures Studies"

BOOK OF ABSTRACTS

edited
by

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1030	Schrödinger's cat – bringing the future back to life *Roumiana Gotseva, Foresight Alliance, UK*	Connecting theoretical and practical interactive foresight: the example of Central Hungarian region *Éva Hideg, Erzsébet Novaky, Helga Veigl, Péter Alacs, Corvinus University of Budapest, Hungary*

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Crews, AndSpace Consulting

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25 August 2011

0900	**Plenary Speaker**

M. Aaltonen
Robustness - Anticipatory and Adaptive Human Systems

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26 August 2011

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0930	Foresight and futures studies: the influence of criticality and cognition *Denis Loveridge University of Manchester, UK, Cristiano Cagnin, IPTS Spain, George Mallen Systems Simulation Ltd, UK, Geoffrey Woodling Business Futures Network, UK*
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1055	Making Headway During Impossible Times – Integral Solutions to the Global 'Mega-Crisis' *Richard A Slaughter, Foresight Intenational, Australia*
1120	An 'honourable' approach to futures inquiry *Peter Hayward, Joseph Voros, Swinburne University of Technology, Australia*
1200	**LUNCH**
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PLENARY SESSIONS

In Theory: Do We Need A Theoretical Framework for Foresight and Futures Studies

Ziauddin Sardar
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We do not think or solve problems in a vacuum. Rather, we are guided by certain ideas – lets call them theories - in the selection of viable problems, in choosing our methodologies to solve these problems, and in making sense of the possible answers.

Theories enable us to make predictions, enabling us to devise experiments, explain our results, and see if our models and ideas correspond to reality 'out there'. Thus, theories are essential: for foresight and futures studies as well as any other discipline. And there *are* many theories within foresight and futures studies. Indeed, organisational foresight as it is practice today itself constitutes a theoretical framework. Many of the methodologies in futures studies, such as futures modelling, forecasting, morphological analysis, Delphi and others have theoretical foundations, even if they are not totally apparent.

But theories have their problems too. Theories can become belief systems and trap us with their framework, preventing us from thinking 'outside the box': notice how difficult it is to get foresight and global modelling to move from predicting *the* future to exploring and shaping futures. Theories can become a substitute for promoting the guru syndrome: for example, Integral Futures is largely devoted to promoting the thought of the American guru Ken Wilber; or Causal Layer Analysis (CLA) the work of the Indian guru Sarkar. (When such theories fight they fight on behalf of their individual gurus.)

And theories can become ideological tools as, for example, technological forecasting has become in the USA. So theories are not all that they are cracked out to be. I would argue that futures studies, by its pluralistic nature, cannot be contained in a single, overarching theory. Futures are like plasma: almost impossible to confine in a given structure. So what we actually need in foresight and futures studies is a system of check and balances. We need theories – sophisticated, rigorous, scholarly – but we also need counter-theories: critical theories whose sole function is to show the limitation of other theories. And through the creative conflict of thesis and anti-thesis, or theory and anti-theory, take the enterprise of foresight and futures studies forward.

PLENARY SESSION

Robustness - Anticipatory and Adaptive Human Systems

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Time has passed quickly. It was four years ago when I started a dialogue with my sense-making colleagues around the world; some of them experts who share the mind set of critical thinking, and some of them decision-makers in various governments and governmental organizations trying to deal with the uncertainty they face. The discussions concerned the ideas, thinking, processes, projects and institutions we use to make sense of and to build our respective futures. The aim was not to rank or compare the countries between themselves, but rather to find out if there exits conditions for a novel, more robust sense-making and decision-making theory.

A lot has happened during the research. At the time of writing, in the spring of 2011, the entire world is reeling from a financial crisis. At the top of the economic ladder, the rich are poorer. In the middle, decades of hard work by hundreds of millions of people has been lost to a sudden financial tsunami. And at the bottom, the poor have again been pushed aside. The credit crunch has undermined faith in our economic and investment systems and raised difficult questions for policy-makers and private individuals alike. It has undermined or destroyed the credibility of many of the foresight, planning and investment theories and the reputations of the past generation.

SESSION 01- Issues in Futures Studies

Ontological Aspects Futures Studies

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During the past fifty years, futures studies have assumed an increasingly explicit professional nature. Unfortunately, theories able to support and guide practice have remained somewhat underdeveloped, as shown by the finding that most practitioners still adhere to the distinction between *facta* and *futura*.

We shall see that the difference between *facta* and *futura* is too primitive a distinction to provide a basis for futures studies. With the subsequent introduction of dispositions, *futura* are no longer confined to cognitive attitudes, they also become a problem of reality. Dispositions are the simplest case of latents, those features of reality embedded in it beneath its surface. Latents are real forces and structures that work below the threshold of visibility.

As soon as one realizes that not everything real is superficial, that there are aspects of reality which remain hidden and need appropriate methods to be brought to light, one is forced to conclude that a more sophisticated theoretical framework is required.

SESSION 01 – Issues in Foresight Studies

Schrödinger's cat – bringing the future back to life

Roumiana Gotseva
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Purpose – The paper explores new thinking based on recent discoveries in neuroscience combined with certain interpretations of the complexity sciences as they apply to human systems with the overall aim of designing (or streamlining) foresight processes that are better equipped to enhance decision-making and action in an inherently unpredictable, ambiguous and complex world.

Design/methodology/approach – The work is informed by several strands of thought: Iain McGilchrist's review of breakthroughs in neuroscience on the workings of the bihemispheric brain (*The Master and his Emissary: the Divided Brain and the Making of the Western World*, 2009); Ralph Stacey's conceptualization of complex responsive processes; phenomenological psychology; Action Research/Action Inquiry; as well as certain coaching practices. It will illustrate its approach to the future as an integrated whole with the example of Goethe and his unique way of science (*The Wholeness of Nature -- Goethe's Way of Science*, Henri Bortoft, 1996), interspersed with present-day examples.

Findings – Foresight practitioners can increase the value of their activities by extending beyond the purely cerebral, left-hemispheric approaches of analyzing trends, weak signals and emerging issues in linear, cause-effect terms with the intention of 'grasping' what the future may hold. Such approaches, though necessary and useful, tell only half the story about the future, and it is a story mostly about utility (opportunity maximization or risk management), characterized by a need for certainty, fixity, and knowing: forecasts (single or multiple) regarding future destinations. This widely practiced approach yields seemingly useful insights for decision-making but it also tends to 'kill the cat' – i.e. it renders the future lifeless, static and devoid of meaning on its own terms.

A purely right-hemispheric approach, on the other hand, largely pre-verbal, empathic, intuitive, metaphorical and implicit, left unexamined, could quickly turn into a values-laden and normative stance at best, or into fuzzy wishful thinking leading to paralysis at worst ('let's not open the box lest we jinx the cat'). Preferred (or, conversely, feared) tacit visions may unknowingly project themselves onto the wider expectations about the future and blind-side practitioners and clients into narrowing or completely closing down their options.

On their own, both approaches prove lacking (in their own respective ways) for providing an integrated *understanding* about the future that would help decision-making in the present.

A differentiated, yet integrative approach that is able to synthesize the two ways of knowing by returning to the lived experience in the present can produce Gestalt-like insights that could fundamentally change how we think and act today. Such a synthesis rests on the ability to hold paradox and sustain the tension of the two (left- and right-brain) approaches long enough for our perceptions to shift and reconfigure into a completely new understanding of the future that would lead us to change our relationship with the present, opening up newer and more diverse choices for action.

The recent neuroscience findings about the two separate worlds (and ways of knowing) of the divided brain and how the left and right hemispheres interact with one another have profound implications for the practice of future studies. These findings suggest a naturally integrative-- **embodied** --3-stage process for conducting foresight work that mirrors the workings of the human brain (RB -> LB -> RB). Importantly, because the two modes of perception and processing tend to inhibit each other, separating them into discrete phases allows them to fulfil their true potential without hindering one another. The 3-staged process for embodying the future promises a 'both/and' synthesis of our foresight explorations that better translate into actionable insight in the present.

SESSION 02 – Futures and Foresight

Youth as future makers: The trends, the trials and youth's contribution to the future

Krystina Lamb   Samantha Wilcocks

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(SKYPE presentation)

Purpose – The youth are tomorrow's future makers. While seemingly having little power or influence over the decisions of today, they will create the reality of tomorrow from their images of the future. This is why they should be invited to participate in today's discussions; they also bring a fresh perspective, new images and goals to any dialogue. The so called 'Arab Spring' which draws on the activism, aspirations and energy of young people is a powerful indication that it is time for the imagination and altruism of youth to be recognised as sources of social transformation.

Design/methodology/approach – A blend of autobiographical reflection and questionaire is drawn on to frame a context for youth engagement in civil society. The approach is post-structural and blends narrative reflection with Deleuzian sensitivity to the multiple (characterised as the rhizome)

Findings – In this article, we identify trends on the periphery of the youth of today; these are of hope, ethics, community, spirituality and activism. These trends are similar to those identified in earlier studies, indicating the emergence of these trends over time. Then, from a shamanic perspective, the drivers (community, technology, change and leadership) that will shape the future can be understood rhizomically, and each related to the trends in the youth. From this viewpoint the congruent and paradoxical contexts can be seen, allowing the probable future to emerge. The probable future can then be re-worked in the present to represent the collectively desired future of all humanity.

Research limitations – Maps are simply maps and the indications are tentative; nevertheless we feel confident that the multiple and emergent aspirations expressed by youth in their choices and actions will make for a more sustainable future.

Research implications – Developing post structural approaches to social transformation via autobiography and questionaire.

Practical/managerial implications – Young people are an asset in learning organisations and can offer significantly divergent possibilities for decision makers.

Public Policy Implications – Civil society is a dynamic forum for social learning and should construct social contexts to channelise and optimise on youth aspirations and creativity, especially in the face of seemingly instransigent problems.

Originality/value – We believe that as young people our approach is grounded in our lived experience and we acknowledge this embodiment of scholarly praxis as the starting point for relevant social science.

Keywords - Youth, Trends, Arab Spring, Youth contribution, Future, Youth Futures, hope, ethics, community, spirituality and activism

Paper type: Research paper

SESSION 02 – Futures and Foresight

Connecting theoretical and practical interactive foresight: the example of Central Hungarian region[1]

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Purpose – The purpose of the study is to present the possible connections of theoretical and practical questions of the realisation of foresight activity based on integral futures studies (IFS).

Approach and methodology – Our hypothetic perception on IFS could be summarised with the following assumptions:
- we distinguish the futures formed along the arrow of time from those future images that are shaped within the thinking of societal actors, and the continuous interaction is considered necessary;
- the theoretical questions raised upon dealing with futures and the possible answers (IFS), the planning and implementation of foresight activity that is specific in space and in time (practical IFS) are all influenced by both perception of the future;
- the formation of theoretical and practical IFS in their impact on each other can be assured by expressing theoretical assumptions in practical foresight processes, following them up and testing, as well as by exploring observations of practical foresight activity and integrating them into the monitoring of pertinence and development of theoretical assumptions;
- interactivity is a key issue in the interconnection of theoretical and practical IFS, and during the practical integral foresight activity as well.

Findings – We present the results of testing theoretical hypotheses through the example of interactive foresight of the Central Hungarian region's economic vision referring to the following topics:
- the conservation of future's openness and its possibility to be formed and its transformations during and as a result of the interactive foresight process;
- how the participativity of stakeholders supply the evolution of participatory democracy and the future orientation of actors;
- how the different online foresight exercises planned in advance supply the interactive character of the construction of future thoughts;
- how the learning process of stakeholders could be detected and followed with online solutions.

We present our practical observations while making a foresight and their theory forming references in the following questions:
- how the finding and integrating of stakeholders in the foresight activity is connected to the societal-cultural-technical environment of Hungary;
- how the future orientation of stakeholders influenced their foresight activity, the diversity of their alternative future thinking and the possibility and extent of their convergences;
- how the opinion leader groups were formed from the stakeholders with the same possibilities, and how they affected the shape of alternative future thinking and the life stories of each future alternatives;
- how the online form of foresight enhanced or created obstacles to and risked the maintenance of participativity;
- which foresight manager qualities were intensified by the organisation and realisation of online foresight;

Research limitations – The limitations of our research have derived from the uniqueness of interactive online foresight. We have not have the possibility to compare it with similar foresight activities. Moreover the specific Hungarian circumstances were a considerable limitation that enabled only a modest level of willingness to participate and of activity.

Research implications – Our research results support the interpretation and possibilities of cultivation of IFS, and enhance the national development of active relations to the future. The future orientation and thinking in alternatives of participants of the online interactive foresight process have measurably raised. The publication of those thought about the future that have been explored and shaped as a result of the foresight process could shape the relations to the future and future thinking of decision makers and of those economic and societal actors who were not participating in the foresight process. The elaborated future alternatives could induce further discourses about the "shapability" and desired shaping of Hungarian future.

Originality/values – In this research we have developed one possible interpretation of IFS, and based on that we have organised the interactive and online foresight process.

Keywords – integral futures studies, interactive and participative foresight, online methods in the foresight process

Paper type: Research paper

SESSION 03 – Foresight and Strategy

A Strategizing Perspective in Foresight

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Background: Foresight is a well-established field of practice and more recently an emerging academic field. The most academic foresight literature is descriptive or normative and relates to the practice of foresight. However, it is generally acknowledged in literature that there is gap between practice and theory in foresight, and recently literature has discussed the possible 'theoretical underpinning' of foresight and possible theory building in foresight.

Purpose: The overall purpose of the paper is partly to contribute to the discussion on the theoretical perspectives behind the practice of foresight and partly to suggest a strategizing approach in foresight practice. More specifically we focus on foresight as a policy tool for sectoral innovation.

Approach: As repeated by numerous practitioners and scholars foresight is not only about looking in to the future but also about make things happen today. Also as noted by several scholars the practice of foresight over the recent decades has changed from focusing on intra-organisational planning and forecasting in science and industry to put more emphasis on open and inter-organisational "strategizing" with inclusion of external stakeholders in the processes. The approach of the paper is to develop a concept for such strategizing.

The paper uses three different theoretical approaches to gathering insights and inputs in order to facilitate strategizing in sectoral innovation systems. First, the literature of the innovation systems gives theoretical elements for *ex post* analyses of actors, institutions, knowledge flows, interaction patterns and dynamics of the considered system. This approach comprises both the current state of the sectoral innovation system and its ability to change. Second, the literature of futures studies gives an *ex ante* approach, with focus on long-term opportunities and trends and thus outlining future goals, roadmaps and priorities. Third, the litterature of governance of innovation policies focus on realization and implementation of plans and in this way suggest how to reach goals. This literature also dicuss the policy measure tool box that might be available for policy makers.

The paper draws on a cross-disciplinary study on the Danish agri-food sector.

Keywords – Foresight, Strategizing, Innovation, Sectors.

Paper type: Conceptual paper.

SESSION 03 – Foresight and Strategy

Using Delphi-based scenarios to improve the long-term strategy development process

Bernadette Förster, Tobias Gnatzy, Heiko A. von der Gracht, Inga-Lena Darkow
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Purpose: Long-range planning is a continuous process of making entrepreneurial decisions in respect of the futurity of present decisions. Companies which engage in long-range planning have proven to be more innovative and able to adapt to changes and exogenous shocks more quickly. In long-range planning, the scenario technique has been identified as one of the most powerful approaches to anticipate and deal with complexity and volatility. Nevertheless, few studies exist which describe how scenario planning can be applied to improve strategy development on an organisational level.

The purpose of this paper is to show how companies can develop corporate strategies based on the findings of scenario planning activities. We exemplify a scenario transfer into strategy development for a company in the logistics field. With data obtained from a Delphi survey among top decision makers and strategists we illustrate how our case company developed expert-based scenarios for the long-range future. Besides its purpose as procedural guideline, our contribution can be used to test a company's business model and strategies for future-robustness.

Design/ methodology/ approach: In order to develop plausible and consistent scenarios, a Delphi study has been conducted. We developed 18 Delphi projections for the logistics industry until 2020 and beyond with a focus on changing customer demands and behaviour, changing competitive environments and developments technologies.

An international Delphi panel was asked to rate the projections' probabilities of occurrence, impacts on the logistics industry, and desirability plus to provide qualitative reasons for all answers. Resulting quantitative and qualitative data has been used to develop plausible, valid and consistent scenarios.

Findings: Research is still in progress, but will have been finished until conference date. However, it is expected that the proceedings for embedding scenarios in strategy development will be as follows: We first develop a strategy which is robust in a test against the most probable scenario. Additionally, the strategy will be tested how it performs in other scenarios. Further, our paper will show how to use the scenario approach to identify early warning signals.

Research limitations: The scenarios are developed on the basis of 18 projections. It might be necessary to consider additional projections focused on other relevant perspectives for long-term strategy development.

Practical implications: The paper offers a guideline for companies on how to embed scenarios in their long-range planning. In particular a procedure for scenario transfer is illustrated based on an expert-based Delphi survey of top decision makers.

Originality: We show how scenario planning can be used to develop future robust strategies on an organisational level.

Keywords: strategy, scenario, Delphi, long-term, future

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SESSION 04 – Technology Foresight 1

Use of Bayesian Networks in Technology Foresight, Risk Assessment, and Horizon Scanning

A. Vaseashta[1], U. Diwekar[2], J. Giordano[3], S. Vaseashta[4], E. Braman[1], P. Susmann[1]

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Strategic decision-making requires a knowledge base, analytical capability, foresight, risk-assessment, and optimization. Decision-making often involves multiple, conflicting goals and poses challenging optimization problems due to inherent and accompanying uncertainty.

The Institute for Advanced Sciences Convergence (IASC), an activity of Norwich University Applied Research Institutes (NUARI), employs futures-oriented analytical methodologies, including heuristics, data-mining, scientometrics, modeling and simulation, and scenario development to provide systematic recognition and evaluation of new or existing scientific and technologic (S&T) solutions and their potential for integrated, novel and/or unconventional approaches to 21st century challenges. The process of Advanced Sciences Convergence (ASC) is to understand and employ - advances in different disciplines, to focus upon discrete problems and applications, and coalesce an integrated system dedicated to solving seemingly intractable problems. ASC requires persistent monitoring of new and emerging domestic and international S&T developments in multiple disciplines, and mandates understanding of far-reaching, visionary, yet achievable, albeit undefined, outcomes that can be described in terms of desired actions or qualities of the eventual system.

A "framework by design" of emerging S&T advances is posited through a systematic and strategic planning process to identify fully integrated solution paths. The IASC utilizes several futures-oriented approaches, viz. Technology Foresight and Roadmapping (TechFARM), Automated Data Mining and Surveillance (ADAMS), and New and Emerging Science and Technology Surveillance (NESTS) – comprising three overlapping practices of future studies including:
1) foresight - the identification of future S&T developments and their interaction with society and environment(s) with the purpose of guiding actions to produce a more favorable future; 2) assessment – focusing upon the impacts of S&T; and 3) forecasting - envisioning the emergence of performance, features, or impacts of S&T in extrapolated time scales.

Uncertainties are inherent in technology foresight and assessment. The Vishwamitra Research Institute (VRI) uses efficient Bayesian updating techniques for assessment of uncertainties and optimal decision-making processes. This presentation focuses on an efficient approach to Bayesian updating for large scale real world systems based on quasi-random number methods. Further, it has been found that Bayesian updating is also useful for optimal decision-making under uncertainty conditions in which a large number of model runs are required to be calculated for uncertainty representation. An algorithm termed "Better Optimization of Nonlinear Uncertain Systems – BONUS" is derived based on Bayesian updating and Bayes theorem. This algorithm significantly reduces the number of model runs, and provides optimal decisions in the face of uncertainties. The presentation aims to develop systematic methods, algorithms, and approaches for rapid, reliable, and robust multiple objective optimal decision-making under uncertainty conditions such as those relevant to horizon scanning, technology assessment, policy making, and decision support. Furthermore, we argue that Bayesian and quasi-Bayesian models are of considerable value in light of identified neural mechanisms and patterns of complex decision-making; thus we posit that ASC methods and tools are reflective of, easily extrapolated to, and thereby highly likely to augment decision/uncertainty-resolution processes, and in this way

facilitate sustainable leftward shift(s) in problem-solving, learning, wisdom acquisition and innovation dynamics.

SESSION 04 – Technology Foresight 1

Developing a holistic backcasting approach for systemic technological transformations towards sustainable mobility
– theoretical advancements and empirical findings –

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Purpose – The automotive industry is the largest manufacturing sector in the world. Due to prospected radical technological changes regarding powertrains, the industry faces paramount challenges that are about to change established industry patterns. The purpose of this paper is to develop a holistic backcasting approach and to show how this approach can be applied for elaborating on the future of the automotive industry. Regarding the latter, we analzye how future automotive power train technologies evolve, while also identifying the necessary steps to realize a desirable future.

Design/methodology/approach – The backcasting approach applied at hand comprises two steps (1) scenario development and driving force identification through a Delphi survey and (2) analysis of the interplay of the driving forces via semi-structured interviews to envision the path to a desirable scenario. The scenarios focus on the future state of mobility in the year 2030. Experts were asked to rate future projections' probability of occurrence, impact on the automotive industry, and desirability. The Delphi expert panel discussions (in total 140 participants) resulted in more than 2,000 qualitative arguments which were used for scenario writing and the identification of influencing factors. For the second Backcasting step, we interviewed 40 designated industry experts to shed light on the interplay of the most decisive influencing factors and how they should evolve for 2030's desirable vision to become reality.

Findings – Based on the findings of the Delphi survey, we developed both a desirable and a likely scenario for the mobility of the year 2030 in order to contribute to vision-building as a starting point for shaping fundamental processes of transformation in the field of mobility. Via software-based coding, we analyzed and structured the qualitative expert statements and thus identified nine key influence factors on the path to sustainable mobility. The results of the semi-structured interviews confirm the desired dominance of e-vehicles in 2030. Also, experts indicate that incentivising customers and establishing electric two-wheelers on the market are of key importance for the desirable scenario to become reality.

Research limitations – Due to the nature of the research at hand, the driving factors were discussed from a marcoeconomic perspective, requiring a more in-depth analysis in the future.

Practical/managerial implications – The findings provide valid and reliable data for scenario planning and the implementation of an action agenda by supporting decision makers in developing futurerobust strategies. We provide an outlook until 2030, thus helping organisations to anticipate future situations and to weigh up risks and opportunities. The scenarios and the roadmaps offer different future options and describe underlying consequences for the automotive industry.

Originality/value – The value of our research is twofold. First, we illustrate an expert-based backcasting process that may serve as a guideline for other researchers in the field of future theories. The web-based real-time Delphi in combination with follow-up semi-structured interviews represents an innovative methodology. Second, the development of future scenarios and corresponding roadmaps for the automotive industry in 2030 provides a sound planning base for decision makers in the automotive field.

SESSION 04 – Technology Foresight 1

Mapping Future Needs and Potential Technologies – Case of Biotechnology

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Purpose – Searching for niches within world-wide technology will help small/medium size countries, like Taiwan, to design an appropriate strategy and get a special opportunity to a leading position in the mid- to long- term. In this paper, we attempt to map the future needs and their correspond possible solutions from the technogical point view. From this meta-foresight that we conduct, the potential important technologies could be identified, of which could give more comprehensive information in option-selecting or policy-making.

Design/methodology/approach – We utilize the Delphi topics in Biotechnology fields originated from the foresight reports of Japan and South Korea as an example. These Delphi themes were mapped against the technological classification based on a patent classification system through text analysis. Further, the source/application of technological fields for these future technology themes will be identified, and the linkage or interaction there between can be aggregated and compared. Therefore, the potential important technologies will be recognized.

Findings –According to our mapping result, a meta-foresight can be easily conducted and analyzed through a standard patent classification system. In addition, it may help to solve the practical difficulties faced in the secondary analysis of foresight studies from different countries/regions by providing a consistent classification framework. Besides, the mapping results can be easily aggregated and demonstrated in a holistic view.

Research Limitations – The possible solutions of legislations, infrastructures and etc are be taken less attention. Besides, only few countries' foresight results are be considered in this study.

Public Policy Implications – The mapping results can be utilized by policy makers and foresight practitioners as a strategic intelligence to identify the possible trends and opportunities in a systemic way. The analysis provides a more holistic view of future technology development and the tendency of interactions among these future technologies. Based on analysis of important technology themes derived from these countries, vision difference in technology development was also identified. The result provides much more comprehensive information for designing specific science and technology strategy for Taiwan, upon concerning the historical context in technology cooperation or competition.

Originality/value – This will be the first time to map the future needs and their correspond possible solutions by a standard patent classification system. Our mega-foresight study not only help us to recongnize the potential important technologies, but also to realize the possible relationships between technologies.

Keywords - Horizon Scanning, Delphi Topics Analysis, International Patent Classification System, Biotechnology

Paper type: Research paper

SESSION 05 – Foresight and Industry

From now to future, a technology push perspective on satisfying future demands: A study of biotechnology

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Purpose –In most foresight reports, the description of future scenarios and technologies for satisfying described future demands are the main conclusions of foresight activities. After reading the foresight reports, people may start to think what if that scenario is what they really want it to be true then what should they do now for that expected future? This study tries to develop a systematical mechanism to find the seeds of scientific research result probably affect the development of technologies that may realize the scenario. A database contains foresight technological issues, patents and scientific literatures are conducted, and thus, the trace back from foresight technological issues to science research becomes possible. Furthermore, the biotechnology issues in Japan and South Korea Delphi topics are choose to evaluate the proposed mechanism. The results can be regarded as the references while making investment decision or grant founding or not.

Design/methodology/approach –For mapping of future biotechnology issues in above mentioned two countries' foresight activities, an horizon scanning for Delphi issues in biotechnology fields originated from Japan (the 8th and 9th foresight surveys) and South Korea (the 3rd foresight survey) foresight reports and each of these issues were given a subclass level of International Patent Classification (IPC) code categorized by IPCCAT – a tool from WIPO to assist text categorization in the IPC. The IPC code of each issue is then regarded as biotechnology technique or function related classification.
Non-patent literature simply indicates the academic publication, such as journal paper, cited by the patent. A non-patent reference identification mechanism is also proposed to deal with the USPTO patents granted from 2000 to 2010 retrieved via the IPC codes that mentioned in previous paragraph. The identified non-patent references are the data set of this study, the publishing trend and subject area are further studied. İn this way, research results that may influence the development of future technologies can be revealed in some degree.

Findings –The mapping results can be utilized by policy makers and foresight practitioners as a strategic intelligence to identify the possible trends and opportunities in a systemic way. The analysis provides a more holistic view of current technology development in biotechnology and the tendency of interactions among these future technologies by connecting technological issues, patents, and scientific literatures. Therefore, the research result can provide much more comprehensive information for making decision, designing related S&T strategy.

Research limitations –The foresight issues categorization and non-patent reference identification depend on the text parsing and mining techniques. Thus each categorized result might not be absolutely accurate, but the quality is capable of general trend analysis.

Research implications –The niche of certain country to develop biotechnology industry or invest more resource can be revealed by the proposed mechanism via studied the country's dominated subject areas.

Practical/managerial implications –The proposed systematic mechanism can be adopted to other foresight themes efficiently.

Public Policy Implications - Every technology should have different development portfolio or trajectory. If certain technology development trajectory was found (in this study, the research results at present have connected with future technology), can S&T policy determine the R&D

investment accordingly? The answer is positive. Since government resources are limited, S&T policy makers can adjust R&D investment appropriately to accelerate the development of certain technology which is very possible to be realized.

Originality/value – This will be the first time to map the future needs and their correspond possible solutions by a standard patent classification system. The proposed mechanism can regonized possible research results as seeds of satisfying technology development for future demands.

Keywords – Delphi issues, Non-patent reference, S&T linkage

Paper type: Research paper

SESSION 05 – Foresight and Industry

Technology Forecast 2020 in Taiwan

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Purpose –Technology development has become one of the critical factors of international competitiveness of a nation. As technologies progress fast and get diversified, it is difficult for governments or corporations to pursue all the possibilities with limited R&D resources. Technology foresight has been thus used as an important decision-making activity of a country's science & technology policy. Technology foresight refers to the scientific process involving the use of discussion and communication among experts in order to converge divergent opinions or expertise into a consensus (e.g., by employing the Delphi method). As the methods of foresight have diversified and improved over time, the results of technology foresight contribute more to the formulation of action plans of businesses and policy goals of nations.

Although technology foresight can help reach consensus from experts in various fields and avoid dispersed R&D efforts, there are several challenges faced by all foresight activities. For example, when the foresight results are applied to S&T policy making, criticism emerges as follows: "only scientists participate (making the activity merely a public relations exercise in conjunction with scientists' efforts to secure a science and technology budget)", "the implementation process is long, tedious and exhausting", "foresight activity consumes too many resources/mobilization costs are excessive", "foresight results do not take economic and social development needs into consideration", "foresight activity cannot detail the development items as the priority of R&D budget allocation", and "foresight activity lacks focus on assessing impact or influence on individual sectors".

Design/methodology/approach –As a response to recent calls for more rigorous approach to the foresight, this study aims to improve some major shortcomings of technology foresight which are often questioned in the past. Conducting a forecast activitiy in Taiwan as an example, we firstly designed a survey questionnaire, and invited twenty experts (including eight technology experts, six economists, and six management experts) to examine 56 technology items defined by RAND's "The Global *Technology* Revolution **2020**" project and considered relevant to Taiwan in the next 10~15 years in terms of their impacts on the agriculture, industries, commerce, health, energy, environmental protection, defense, and consumer sectors. All technology items were discussed under the consideration of "feasibility in Taiwan in 2020" and "the socioeconomic demands in Taiwan", "global demands" and "controversiality of development". Then a nonlinear model was designed to perform quantitatively conversion of the expert opinions into the ratings of all technology items.

Findings –Based on the non-linear transformation from expert opinions, technology development items to be realized in Taiwan in 2020 include rural wireless communications, ubiquitous information access, green manufacturing, inexpensive solar energy, ubiquitous RFID tagging applied to the tracking of persons and products, antibacterial, anti-soiling textiles, catalyst and filter technology for water purification, hybrid vehicles, hydrogen vehicles, and electronic transactions.

Research implications - Through the forecast results in Taiwan, this study is also an attempt to build up an implementation process so as to fix some of the major shortcomings of foresight activities in the past. More fine-grained approaches will still be in need for foresight activities to be closely linked with social concensus building upon R&D resource allocation.

Keywords - Technology Foresight, Technology Forecast, Delphi

Paper type: Research paper

Microsoft

TURKISH AIRLINES
TÜRK HAVA YOLLARI
A STAR ALLIANCE MEMBER

Emerald

SESSION 06 – Systemic Foresight

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Systemic Integration of S&T Foresight Methods

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SESSION 06 – Systemic Foresight

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Systemic Foresight Methodology (SFM)

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Purpose: The paper introduces the Systemic Foresight Methodology (SFM). Based on the ideas of systems thinking, the SFM aims at proposing a conceptual framework, which recognises the complexities involved both in real world systems (physical and social) and in idea creation, which emerge due to multifaceted interplays between the Social, Technological, Economic, Ecological, Political and Value (STEEPV) systems. Conducting Foresight systemically involves a set of 'systemic' thought experiments, which is about how systems (e.g. human and social systems, industrial/sectoral systems, and innovation systems) are understood, modelled and intervened for a successful change programme. The thought experiments are conducted in an iterative, dynamic and evolutionary process for Foresight which involves the phases of (1) Intelligence (information gathering and scanning for understanding and appreciating situations) (2) Imagination (synthesis of intelligence and information input into alternative models), (3) Integration (analysis of alternative futures and prioritisation and vision building), (4) Interpretation (translation of visions into long, medium and short term strategies to establish links between the desired future and the present), and (5) Implementation (informing present day decisions).

Design/Methodology/Approach: First, Foresight and systems thinking literatures are reviewed. How systems thinking might assuage the Foresight practice when dealing with complex social and human systems is discussed. Subsequently the SFM is established and its phases are described. Then, case examples, where the SFM has been used, are presented. The paper is rounded off with conclusions on the benefits and practical use of the SFM.

Findings: A Systemic Foresight exercise geared to a specific field (1) Provides a greater flexibility in dealing with specific issues, (2) Leads to the development of diverse and customised Foresight approaches and (3) Makes implementation easier as the products (i.e. policies and strategies) are more compatible with the nature of the subject at hand

Practical implications: The SFM described in the paper would provide theoretical and conceptual frameworks to support Foresight practitioners to cope better with the complexities of the human and social systems.

Original/Value: Although the usefulness of systems thinking has been acknowledged by researchers and practitioners of Foresight, the current paper presents first demonstration of how those ideas can be implemented in a Foresight setting with a systemic methodology.

Keywords: Systems Thinking, Systemic Foresight, Foresight, Methodology, Methods

SESSION 06 – Systemic Foresight

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Grand Challanges and the need for systems thinking to deal with them

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The notion has grown that human societies everywhere face what are being called '*grand challenges*', but just what does that phrase mean? And is the phrase universally accepted or simply perhaps a European idea? While the phrase may be new the notion is not, its symptoms having been in evidence in its modern form since Robert Wallace expressed concern, in 1761, for human futures, due to rising population levels, growth rates and food supply. The Club of Rome introduced the idea of a *world problematique* in the late 1960s and largely accepted the outcome of the *Limits to Growth* report published in 1972: revisions followed in 1992. The message was undiluted - the Earth's **human** population faced an uncertain and possibly difficult future because of the convergence of population, food, pollution, industrial output and resources, and many associated factors, in complex ways. These complexities have been explored differently by Lovelock in several publications since 1979, partly through the use of *planetary* models: these consider the life prospects for the planet as a whole. Lovelock concluded that the Earth is a living system that, through many complex interacting living systems, is self-regulating. Modelling of the Earth's climate, starting from Lorenz's work in the 1960s, has now reached deeply into the world's political system with effects that will be decades in revealing their outcomes, good or bad. In reality the complexity of the forces that converge to create the Earth's life support system remains beyond human understanding in the sense implied by Simon's notion of *bounded rationality*.

Most recently exploration of *grand challenges* has followed conventions from the past, largely influenced by the so called 'scientific method' placing them in bounded silos with an emphasis on problem solving. Science and technology are often seen as the saviours in these circumstances, a notion that stems from the way that these disciplines tend to choose and define problems in ways that are amenable to 'solutions' via their methods, a contentious claim maybe. However, there is a long established undercurrent of thought, among people from many disciplines, that demurs from convention. Starting from von Bertalanffy and Smuts in the 1920s unconventional thought, based essentially on the interconnectedness of systems and their elements, has evolved through philosophical debate, with some metaphysical undertones, to influence thought patterns in biology, ecology, politics and human behaviour. These have been underpinned by increased, though far from complete, understanding of neuro-systems, and into the rarefied regions of mathematics exemplified [perhaps?] by Mandlebrot's work. All that said Alvin Weinberg contends that there are situations where science cannot answer the questions put to it by the polity because science's reply is hedged about with uncertainties, qualifications or simple ignorance. So where does all this leave *grand challenges*? The notion is now invoked whenever a multifaceted, dynamic and complex situation arises. Each of these, though real, are manufactured through **human** perception so that the form of each differs from person to person, country by country. Some of the most prominent are *climate change, security of fuel supplies, the eastward shift of political and economic power, regulation of science and technology especially at the nano-scale* and a collection of situations I set out in the Autumn of 1977 which was published later, in December 1983, under the title *Computers and you*. The essay ended pointedly as follows '*Computers and you' is no longer the mildly bizarre idea that it was in 1977 or earlier, but whether society fits into the concept of "computers **and** you" or "computer **or** you" is a matter of social concern that is unlikely to be resolved by the turn of the century, while the outcome will persist for very much longer.* The social concerns are far from resolved, while the battle rages between the [international] social mood and the ever increasing intrusion into peoples lives, *even in remote and/or poor regions* of digital based products and processes that, *paradoxically, enable social control and social progress.* If foresight has a role to play surely it must be the resolution of the

clash between the meanings of the word foresight itself that, in the Oxford Dictionary, are *care and provision for the future* **or** *the muzzle sight of a gun.* Perhaps this is **the** *grandest challenge of all.*

SESSION 07 - Scenarios

Linking global to regional scenarios: the AG2020 approach

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Purpose – The overall aim of this research is to elaborate on the intriguing issue of linking multi-scale scenarios, by presenting the approach adopted in AG2020 for linking EU-wide backasting policy scenarios for the EU agriculture in 2020, to regional policy scenarios that are developed in certain regional EU rural environments.

Design/methodology/approach –The approach adopted aims at linking EU-wide to regional scenarios in agriculture and rural development. A 'loosely linking approach' is adopted in this respect, serving the linking of the above two level scenarios, based on their structural elements and resulting outcomes.

Findings – The experience acquired by the present research shows that the effort of linking diverse spatial scales (EU and regional) may provide valuable information to policy makers both at the EU and the regional level, by establishing the 'communication' between the different scales and the exchange of information to the benefit of decision making at both levels.

Research limitations – The approach adopted in AG2020 for interlinking EU-wide and regional scenarios is conditioned by the limitations imposed by the study framework. However, the adopted approach may serve as a useful tool to the policy making processes at both levels.

Research implications – This research presents the AG2020 approach on linking multi-scale scenarios, which may contribute to the methodological efforts undertaken in this direction.

Practical/managerial implications – The paper presents a step by step linking process that can be of support to practical applications of both the practitioners and decision makers.

Public Policy Implications – The interactions studied at the various scales (EU and regional) in the AG2020 context provide valuable information on the peculiarities of the diversified rural contexts in Europe. These may support decision making processes for the future agricultural developments in the European territory. On the other hand, policy makers at the regional level may potentially increase their knowledge base on global issues that need to be dealt with at the local level.

Originality/value – The present research consists a valuable contribution to the issue of multiscale linkages, by presenting the experiences gained in this example.

Keywords – multi-scale scenarios, linking global-regional scenarios, backasting scenarios

Paper type: Research paper

SESSION 07 - Scenarios

Support for Scenario Statements
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Purpose – This paper presents a method for identifying the reasoning and empirical support for statements of possibility (scenarios). The support for predictive statements can be evaluated using standard inferential analysis, but statements of possibility are true as long as they do not violate known laws. As a result, futurists do not have an accepted method for evaluating the support for scenario statements, particularly for whether some scenarios are quite plausible versus being just possible.

Design/methodology/approach – The proposed method is based on the inferential analysis of predictions. Predictions are declarative inferences about the future that require evidence to be accepted. Each piece of evidence used to support a prediction requires at least one assumption (a warrant) that allows that piece of evidence to be used in support of the prediction. Some assumptions have plausible alternatives that might be true instead of the original. Plausible alternative assumptions not only weaken the support for the prediction; they concurrently create paths to alternative futures (scenarios). So the process of identifying and justifying alternative assumptions is also the process for supporting the alternative futures that they create.

Findings – The illustrative example for this method is the possibility of a military conflict between the U.S. and China in the next 20 years. Using the likelihood of such a conflict as the prediction, the analysis develops in turn – 1) the evidence for such a prediction, 2) the assumptions required to use that evidence in support of the prediction, 3) plausible alternatives to those assumptions along with the reasons for their plausibility and finally 4) the alternative scenarios that result.

Research limitations – One may be able to support alternative scenarios by treating each one as a prediction and evaluating its support in the traditional manner, a process called Alternative Competing Hypotheses (ACH). However, few futurists use this process either.

Research implications – While becoming more popular in recent years, scenario forecasting has still not achieved the credibility and legitimacy that science and history have. One difference between the fields is that historical and scientific researchers have a standard way of presenting and evaluating the quality of inferences they make. Evaluating the quality of futuristic statements in scenarios is more difficult, and hence is thought not have the rigor that other disciplines have. The method proposed here is a way for futurists to present their findings in a way that shows the evidentiary support for their claims so that others can discuss and evaluate them.

Practical/managerial implications – The academic presentation of results is used primarily by researchers and academics in communicating with each other rather than with clients. Having a rigorous method for presenting and evaluating each others' claims, however, will eventually influence otheres to take the well supported claims more seriously, just as they do in the sciences.

Public Policy Implications – The most recent article accepted for Futures (May 18) concludes, "…comparisons and assessments of energy futures should be made through processes of scrutiny and assessment, looking into the ingredients which have been used in constructing the respective futures, and into the process of their composition." (Grunwald, in press) Grunwald's point is that policy decisions are increasingly based on future scenarios, but the futures field has yet to develop an accepted method for evaluating the quality of the scenarios they produce.

Originality/value – No one has proposed a comprehensive method for evaluating the quality of the support for scenario statements. Were such a method to be adopted by the majority of futurist in heir professional communications, such as those found in peer-reviewed journals, futures studies would enjoy greater credibility and legitimacy.

Keywords – Scenarios, inferences, support, evaluation, quality, assumptions
Paper type: Methodology proposal

SESSION 07 - Scenarios

Visioning in backcasting in agriculture: the AG2020 approach

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Purpose – The focus of this research is on presenting the AG2020 innovative backasting methodology for structuring policy scenarios in agriculture at the European level for the year 2020.

Design/methodology/approach – The AG2020 methodological approach is based on the backasting methodology, which sets out objectives and targets for building the "Images of the Future" and orienting the future of the EU Common Agricultural Policy towards the pursued targets. The backasting scenarios (images and related policies) provide possible alternative policy options for agriculture in Europe 2020. These are based on: a set of key elements (areas of change), identifying the most interesting areas of change in the study system; key states, indicating the levels of change required to achieve the proposed targets; a set of images of the future, structuring future decision environments; policy measures, clustered on the basis of their orientation (e.g. lifestyle); and policy packages and paths, driving future developments towards the desired ends.

Findings – The AG2020 approach resulted into a set of 'images of the future', a pool of the most relevant policy measures, but also policy packages and paths, paving target-driven future developments in the EU agriculture.

Research limitations – Data availability for applying modelling approaches that are necessary for building the baseline scenarios in a backasting context.

Research implications -

Practical/managerial implications – The AG2020 approach presents a cohesive and transparent methodological tool that may serve the interests of the various stakeholders e.g. policy makers at the EU, national and local level, stakeholders in the agricultural sector, foresight research community, etc.

Public Policy Implications – The outcome of this research is quite relevant to policy makers at the various levels, serving the goal of sustainable agricultural development.

Originality/value –Most work undertaken on the future of the agricultural sector in EU is based on the integrating previous exploratory approaches into the backasting framework. In this respect, the backasting approach, adopted in the present research study, adds value to the methodological framework but also to the results obtained. Moreover, it supports target-driven policy decisions that are largely based on the participation of both the research community/experts and the stakeholders at the various spatial scales. This fact has further enriched its value as to the variety of views involved and the potential for acceptability of the proposed policy paths.

Keywords – EU agricultural sector, backasting methodology, Images of the Future, Policy paths

Paper type: Research paper

SESSION 08 – Theory and Practice

Study on Developing the Future Readiness Index Framework: Methodology and Applications

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Purpose – The overall aim of the research presented is to introduce **Future Readiness Index Framework** in order to measure the extent to which society is working for future change, and its respective activities.

Design/methodology/approach – *Future Readiness Index framework* integrates two main approaches, and is divided into two sub-frames: process of action to prepare for the future (SAVE frame) and main factors that will determine the success of future adjustment (HERE frame). The first process of future preparation will be Search (S) for potential changes, followed by Activities (A) of research and investment, of which the quality of outcomes will be created through Value-added action (V), which then will receive feedback through Evaluation (E). These four processes are the component indexes belonging to the SAVE sub-frame. And HERE frame composed of Human resource (H), Economy (E), Resource (R), and Environment (E). These four components are broken into micro dimensions: Human resource, Economy, Resource and Environment. Such integrated approach allows the Index to capture the process of nation's actions involved in future readiness.

Findings – Denmark ranks the top with a score of 65.5, followed by the Finland scoring 65.1. Sweden and Switzerland also comes to the upper ranking in which North European countries are performing well across all the component indexes. South Korea's ranking is 23rd with the Index score of 47.38. Future Readiness Index is a good milestone for better decisions regarding changes of our society

Research limitations – In this paper, It is introduced the conceptual framework of **Future Readiness Index** *for comparison among countries. But It is is needed to be* developed the more suitable indicators for our conceptual framework, not to dependent too much on that of IMD. And it is noted that Future Readiness Index is not a perfect tool that can accurately forecast the future or assess the nation's capability within the future environment.

Research implications – This research evokes the importance of 'prepartion for the Future,' whereas other future studies mostly focus on foresight or forecast of the future. This research is also meaningful in qualifying the future readiness levels of each of countries.

Practical/managerial implications – *Future Readiness Index framework* can be used for measuring the level of national readiness for the future and also provides the normative framework for establishing the policy for future preparation in the national level.

Public Policy Implications – As the world is more connected and the society are changing more rapidly and complexly, future national competitiveness are directly linked to the sustainability of the nation. This reserach indicates the necessity of the long-term policies for developing human resource with Future capability, realizing the society for embracing other cultures and setting up the culture for decmocratic communication.

Originality/value – This research is meaningful in its idea for 'Qualifying the Future readiness'. This research suggests that the direction of futures study that requiers the insight of future readiness, as well as foresight and methodology for futures study.

Keywords – *Future Readiness Index framework*, SAVE frame, HERE frame, nation's capability, Denmark, Finland, S.Korea

Paper type: Research paper

SESSION 08 – Theory and Practice

The CO$_2$–Reducing Trading Strategy of Petrochemical Firms in China -A Scenario Analysis

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The purpose of this research is to study the carbon dioxide (CO2) emission reduction strategies alternatives adopted by the Taiwanese petrochemical firms investing in China, how these firms developed their CO2 reduction strategies under the impact of changing environment of the world and China for the coming period of five years and fifteen years.

This research uses in-depth interviews and three rounds of Fuzzy Delphi questionnaires with eleven experts from the industry, government departments and science institutes; and has successfully underpinned some key factors that influence the strategies decision making, including the Chinese government's attitude and practice towards CO2 reduction and trading, the Chinese political system, and maturity of related technologies. In addition, this research develops a two-axis and three strategies scenarios for 2015; and a four-axis and seven strategies scenarios for 2025.

The results of these scenarios show that main factor that affects the decision making is cost, followed by green energy technology which is considered as investment project for few companies. Government regulations limit, purchasing carbon credit is the last strategies that will be considered by the firms.

Keywords: CO2 trading, Scenario analysis, Fuzzy Delphi Method

POSTER SESSION - Complexity, Narrative, Participation, and Images of the Future

What opportunities do traditional arts, digital media, and social networks create for foresight and futures? What new approaches do these media and digital platforms provide for engaging people in creating and exploring alternative images of the future? How can group-sourced futures creation and exploration put chaos and complexity theories in service to basic futures theory? How can they enhance experiential engagement in the futures dialogue?

Design Futurescaping

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'Design Futurescaping' refers to a cluster of linked research methods at the intersection of foresight and design. Moving beyond current disciplinary boundaries, how can we collaborate with experts and laypeople to explore and prototype desirable futures? How do you generate the conditions for invention and experimentation? We dissect some of our previous projects, demonstrating how montage, graphic mock-ups, film sketching, and 'post-psycho-geography' can help us research and (re)present the nuances of future scenarios.

Massively Multi-player Futuring: IftF's Foresight Engine

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Most research in futures studies centers around two core areas: *images of the future* and *signals*. Images of the future are the ideas, beliefs, and visions people have about what's to come. Signals are bits of indicative information or inchoate developments that, while relatively unknown to most people in the present, are forecast to have a large impact on the world in the future. Engaging large numbers of people in futures activities is a way to widen the sample size and diversity of images of the future, as well as to elicit new signals that might have gone undetected.

Starting with the Delphi method, brought over from RAND by co-founder Olaf Helmer, the Institute for the Future (IFTF) has had a long history of utilization of, and experimentation with, collaborative forecasting techniques. Leveraging the Internet and new gaming platforms, the reach, scope, and speed of collaborative forecasting have increased dramatically in the last decade. This poster will focus on IFTF's latest methods to engage large numbers of people in futures and foresight practices. In particular, it will examine IFTF's Foresight Engine, a "massively multi-player" platform that utilizes social networking technologies and norms, gamification techniques, and digital video production to facilitate group forecasting and scenario-based conversations.

POSTER SESSION - Complexity, Narrative, Participation, and Images of the Future

Crowdsourced Collective Intelligence Platforms for Participatory Scenarios and Foresight

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Scenario planning is a structured method for exploring planning and design strategy under severe uncertainty and dynamic change. Most approaches to scenario planning rely on expensive consultants and heavy face-to-face involvement. This poster describes a pilot project in using the collaborative potential of the web to leverage large amounts of participation for emergent scenario creation. This prototype process used a "narrative capture" approach to data collection and was developed in partnership with Dave Snowden of Cognitive Edge and Wendy Schultz of Infinite Futures.

The experiment tested a new approach to crowd-sourced scenario planning: over 265 participants from around the world answered four generic questions relating to the near-term future of public services, given the level of financial uncertainty seen around the world. These questions were:

- What is the future of public service provision under financial uncertainty?
- How will governments and cities adapt to managing public resources under increasing constraints?
- What factors will be critical for public service provision in the coming decade?
- How will these factors combine to influence public service provision in the 2010s and beyond?

In response to the questions, participants submitted brief stories of the future and tagged them via keywords and 'scenario archetype' characteristics. The Sensemaker software system then clustered these brief stories – 'narrative fragments' – based on affinity and representative values, auto-aggregating them into three potential mini-scenarios. The scenarios – essentially mosaics of narrative fragments – were plausible, compelling, and displayed internal logical consistency, thus establishing a basic proof of concept.

POSTER SESSION - Complexity, Narrative, Participation, and Images of the Future

Scenarios: A Hero's Journey across Turbulent Systems

Wendy Schultz, Richard Lum, Christian Crews

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The most widely used approach to scenario building for scenario planning purposes is the deductive, 'axes of uncertainty' approach developed by Ogilvy and popularized in Schwartz's *The Art of the Long View*. It has been critiqued for creating a 'flatland' of futures – future worlds in which currently ideologies and worldviews were insufficiently examined and critiqued. Additionally, the approach is essentially binary – attempting to create four unique futures from only two main drivers of uncertainty. While participants contribute along the process, the final scenarios are often drafted by outside writing talent.

This poster presents an integrated foresight approach to scenario generation: it is inductive, and builds scenarios up via layers of timeline mapping using the Three Horizons framework; implications mapping using Futures Wheels augmented with the Verge Ethnographic Futures Framework; and finally influence mapping using systems thinking. The resulting influence maps are reviewed for emerging causal loops that represent areas of accelerated change, or areas of constraint to change. The resulting systems maps become the contextual 'backdrop' or scenery of the scenarios; a framework of Jungian archetypes helps suggest a cast of characters with emotional resonance; and the 'Hero's Journey' narrative arc assists participants to write a compelling story set against backdrops of turbulent change within complex systems. The process was pilot tested within a Fortune 500 company and resulted in scenarios that are now significantly embedded within the organizational culture.

POSTER SESSION - Complexity, Narrative, Participation, and Images of the Future

The Singularity is Boring: An Open, Collaborative 'Mock-up'

Justin Pickard, Noah Raford, Wendy Schultz, Jake Dunagan, Scott Smith (and uncounted others)

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The Futures Twitterstream, results at https://docs.google.com/present/view?id=0AR1q-x-Rqc3KZGNxd3J0N3JfMzdmY2d6MnpjOA&hl=en_US

Dator has suggested that a key quality for any futures researcher is a sense of humour, a delight in the absurd. This final experiment in evolving images of the future through complex interactions of a social network occurred in real-time over 36 hours on Google Docs/Present. Its seed was a tweet by @KarlSchroeder, "Mentioned that I was gunning for the Singularity in my next book, to my thesis advisory panel today. There was thunderous applause", that generated multiple suggestions for singularity alternatives. Putting the brainstorm session on Google Docs created space to include additional detail and graphics. Publishing the Google Docs link via proliferating Twitter 'follower' networks generated a viral wave-front of participation – but primarily within the global futures community.

Each image combines several emerging changes, and extrapolates the outcome as a negative, offering a critique of those emerging changes. The event raises interesting questions regarding crowd-sourcing vs peer-sourcing, the role of humour in both intellectual critique and in attracting participation, and the extent to which futures researchers could generate similar viral patterns of participation for more serious topics.

This is offered both as a proof of concept in using social networks to evolve images of the future, and critical dialogue about them, and also as a lighter note with which to end the panel.

SESSION 09 – Issues in Foresight Studies

The origin of foresight

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Purpose – To develop a theoretical framework of the origin of foresight.

Methodology/Approach – Following a review of arguments for foresight as genetically inherited versus environmentally acquired, the understanding of foresight is expanded through radical behaviourism, and through relating the concept to the evolution and survival of the species.

Findings – The origin of foresight is not unlike the origin of the species, survival value or no survival value.

Research implications – The foundation established makes it possible to deploy evolutionary concepts and logic to foresight research as well as to enhance our understanding of foresight, both on individual (e.g. managerial) and aggregated (e.g. organisational) levels.

Originality/Value – The article establishes a foresight framework firmly rooted in science and evolution.

Keywords: Foresight, Origin, Behaviour, Genes, Environment.

Paper type: Conceptual paper

SESSION 09 – Issues in Foresight Studies

Context for Action: a methodological framework for foresight and sensemaking

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Purpose – To develop a methodological framework for looking at emerging issues from the perspective of a professional not formally trained in foresight.

Design/methodology/approach – The methodological framework, Context for Action, was created through a process of action research and the application and comparison of four different approaches to narrative enquiry. A guiding theme was the concept of reducing ignorance as a way of exploring the future. A review of literature, a SWOT analysis and researcher reflection were used to critique and compare four case studies - environmental scanning (4 years' duration), expert interviews (19 interviews), a scenarios workshop (16 participants) and a naturalistic sensemaking survey using the software SenseMaker™ (99 participants). The focus of research was emerging issues in the ergonomics of office work in the context of a government department. The final two case studies were conducted in a large public sector organisation.

Findings – A model in the form of a Sensemaking Spiral connects the framework Context for Action which is a cross section of the spiral, with its action research / action learning roots. The Sensemaking Spiral allows a research project to be positioned with regards to different frameworks for ignorance and knowledge and with respect to time. Honouring multiple ontologies and epistemologies, Context for Action comprises five elements -- perspective, momentum, narrative, patterns and meaning. Each of the elements is defined and tactics for each element are presented. Context for Action proposes that a process for exploring emerging issues should ensure each element of the framework is not only present, but effective. Context for Action provides a way for methodologies from futures studies and other domains to be 'scaffolded' together without subsuming one methodology into another. It allows a comparison of different multi-method strategies to structure action research with a view to sensemaking and foresight, particularly where the context is complex.

Research limitations – The model and framework were developed from the perspective of a single person and from a humanist's perspective - further application for use by teams and in other sensemaking situations have not yet been tested. While the model and framework appear consistent with the available literature, their validity within other domains also needs further examination.

Research implications – Two concepts, ignorance and sensemaking – were found to be important for exploring emerging issues. Context for Action appears to have use as a methodological framework for interdisciplinary studies and for the integration of research. It provides a practical way for the sole professional to explore emerging issues in one or many domains of practice.

Originality/value – This research emphasises the value of ignorance based learning and narrative for exploring emerging issues from the perspective of the novice in futures studies.

Keywords Narrative, qualitative research, complexity, sensemaking, methodology, ontology, epistemology, ignorance

Paper type: Research paper

SESSION 09 – Issues in Foresight Studies

Mobilizing Visions for Innovation: The Role of Innovation Teams

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Purpose –The purpose of this paper is to explore the contingency role that product innovation teams play in mobilising organisational layers differential visions into the direction of an idealised future.

Design/methodology/approach – Drawing on three case organisations and their four new products under development, data for the empirical inquiry was collected using qualitative interviews, non-participant observations and project archival documents.

Findings – We found three distinct phases; *Reflexive observation, Multilateral participation and Consilience* characterising the mobilisation of differential visions of the future in the immediate present. We also suggest three process outcomes of interactions between the vision of the project ecologies temporarily tied together for the completion of the product innovation project.

Research limitations – The findings from this research are based on qualitative in-depth studies of three innovation teams embedded in different organisations, engaged in the development of four different products. While the findings and all evolving theoretical steps were reached by making linkages between emerging categories and concepts, the research could not establish that these findings are generalisable to all software organisations or generalisable to other technology based firms.

Practical/managerial implications – Mobilization of stakeholder visions at the product innovation level is important because it lightens imagination, and commits and energizes people to explore potentialities and limits in the present to reach an ideal future. If well managed visioning, could provide a unique platform for developing individual resourcefulness, creativity and quality reasoning which managers or other organisational actors could employ to evaluate others sentiments, fears, anxieties, and / or expectations of an ongoing project.

Originality/value – Contribute to the management and foresight litearture by identifying and explaining how some relevant behavioural and discursive tendencies by innovation teams in context might enable the mobilisation of stakeholders' differential visions through consensual integration to enact a shared image of the innovation that can provide the basis for sustainable value creation and capture.

Keywords - Vision, visioning, product innovation, foresight, project ecologies

Paper type: Research paper

SESSION 10 - Backcasting

Organizer: Mattias Höjer, Royal Institute of Technology, Sweden
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Backcasting – what and why?

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Purpose – The overall aim of the research presented is to formulate a more precise definition of backcasting, in order to increase the understanding and usefulness of backcasting among both researchers and practitioners.

Design/methodology/approach – The paper will be based on literature studies of research papers and reports., and on the authors' long experence of working with backcasting. A high amount of papers on backcasting has been produced the last 20 years, and a number of different categorisations have been made, see for example a speciel issus on backcasting in Technologica Forecasting and Social Change (in print). The literature will form the base of this paper, but the intent is not necessarily to produce a typology covering all backcasting studies. Instead, a more normative approach is taken, aiming at producing the authors' view of backcasting, justified by the needs of the research field to narrow and clarify the concept of backcasting.

Findings – The popularity of the term backcasting has led to a use of the term for many different types of studies. Today, "backcasting" can be seen as among other things a tool for increased participation or a tool for awareness building. The variety of methods risks making the concept useless, and therefore a more stringent way of presenting backcasting is suggested.

Research limitations – The importance of a paper of this kind is dependent of how much it is used. The author of this paper has previously written a paper on a "users' guide to scenarios", which is the most-cited paper in Futures the last 5 years. I intend to invite at least one more well-known researcher from the backcasting field to co-author this paper, but we have so far not had time to write this abstract together.

Research implications – A paper of this kind can be of high importance for backcasting studies in the future. It will force researchers to be more precise in what they mean with backcasting, and that way make the area more focused.

Public Policy Implications and **Practical/managerial implications** – A paper of this kind can have high pedagogical relevance for the non-research community by offering a framework for interpretation of studies that practitioners read, and ask for. Without knowledge about what backcasting is, it is easy to either overestimate such studies or neglect them. With knowledge of them, and of different kinds of backcasting, the use of backcasting studies could be more efficient and widespread.

Originality/value – There have been a number of partial attempts to categorise backcasting, but there is a need for a stronger statement with the basic aims of backcasting in focus. It might be a bit controversial to produce a definition of backcasting that may not cover all studies called backcasting. But an apple does not become a vegetable just because someone says so. However, the analytical and discussion part of the paper becomes crucial for the success of the paper.

Keywords – backcasting, categorisation, typology, usefulness

Paper type: Research paper

SESSION 10 – Backcasting

Application of Chaos Theory in Futures Studies and Back Casting to Evaluate the Theory in Iran History

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Chaos theory is the qualitative study of unstable aperiodic behavior in deterministic nonlinear dynamical systems. In this definition the system is dynamical, means that it changes over time. The behavior of the system is aperiodic and unstable means that it does not repeat itself. Although chaotic behavior is complex, it can have simple causes. Because the system is nonlinear, it is sensitive to initial conditions. The social systems have the same features as we mentioned above. Therefore social systems behave like a chaotic system. They are complex and nonlinear dynamical systems. Since in a society there are many variables every of them will be effective in the future, foresight is indecisive and very complex process. Chaos theory based on its concepts could offer a suitable insight to study the future. In this paper, a chaotic model will be applied to study the futures based on present variables. Chaos is important, in part, because it helps us to cope with unstable systems by improving our ability to describe, to understand, perhaps even to anticipate them.

In analyzing the present factors we will consider the butterfly effect. The 'butterfly effect' has become a popular assumption of chaos theory. It appears that applying the butterfly effect in time vector addresses those things that are continually happening. But is it really so surprising that minor details sometimes have major impacts? To evaluate this assumption we will use a 'back casting' method. Our case study in back casting is history of Iran. We may regard the present state of the universe as the effect of its past and the cause of its future. An iterative and incremental process of history and also the future will be shape the vision of a society.

Key words: chaos theory, time, society as a chaotic system, butterfly effect, back casting, Iran past, present and Future

SESSION 11 – Impact of Foresight Projects

Organizer: Karl-Heinz Leitner, Austrian Institute of Technology, Austria
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Foresight as Impulse for Change in Actor Behavior?

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Purpose – Foresight exercises employ analytical, prospective methods in combination with participatory, action-oriented ones. Participatory methods are targeted at gathering the expertise, views and insights from a most diverse and complete system, starting discussion, initiating exchange, and furthering mutual understanding. By stimulating interaction between actors of a system, foresight exercises are thus much more than mere information gathering exercises: They are social processes, embedded in a socioeconomic environment, which has influence on the process and may in turn be shaped by it. However, a foresight exercise is but one potential influence on subsequent behavior of the actors involved. The proposed paper will argue that empirical assessment of impact of foresight needs to focus on *changes in actor behavior in response to a foresight activity*. Conceptual work as well as results from a recent case study suggest that certain resonance from a foresight activity can be expected in subsequent actor behavior. However, it may be necessary to lower expectations regarding the observable impact a foresight exercise can have on its environment.

Approach – The literature on impact of foresight was surveyed for effects of foresight exercises identified so far. It was possible to allocate each of these effects in a two-dimensional model of *range* and *time* of impact. The hypothetical impact channels derived on basis of this model would be discussed in the first part of the paper. The second part of the paper would be used to present a methodological approach for assessing such impact by means of a multiple case study. The paper would be rounded off by a discussion of insights gained from semi-structured interviews with participants of a European foresight process.

Findings – Subsequent actor behavior was identified as crucial element in connecting a foresight exercise to changes of broad and long-lasting nature. Conceptual as well as recent empirical work suggest that the combination of stakeholders, their motivations for participating in the foresight process, as well as their ability to implement change in their home organizations are the most interesting factors regarding the translation of "process output" of a foresight exercise into observable change.

Limitations – Generalization of results is mainly limited by difficulties arising from establishing cause-effect relationships between the foresight exercise and subsequent actions taken by participants. The second part of the proposed paper would include a discussion of how these difficulties could be tackled by surveying motives for actions and influences on decisions ex-post in direct interviews with participants.

Implications – If participants adapt their strategic decision behavior because of what they experienced during (or in connection to) a foresight exercise, this would imply that a) selection of participants and b) moderation of discussion during the exercise are crucial aspects regarding the impact of the exercise on the concerned system. It could also suggest a certain influential power regarding expected impact on the side of the project management team. Furthermore, it would emphasize the participants' potential influence on the development of the system.

SESSION 11 – Impact of Foresight Projects

Organizer: Karl-Heinz Leitner, Austrian Institute of Technology, Austria
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Shaping the Future by combining Emerging Issues with Sustainability Indicators

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Purpose – Apart from providing a framework for stakeholders to jointly think about the future in a structured and constructive way, foresight provides a number of tools to support participants (i.e. policymakers, experts and other stakeholders) to develop visions of the future and pathways towards these visions. Foresight is perceived as a valuable policy instrument which allows for debating, collective sensemaking and finally shaping the future. We present here a horizon scanning and foresight study which was able to reveal policy shortcomings to be tackled in order to meet future societal challenges.

Design/methodology/approach – An extensive analytical review of foresight and forward-looking studies was carried out to distill issues which were assessed through both wide stakeholder consultation and an expert workshop. By synthesizing these issues in an interdisciplinary way, cross-cutting challenges were formulated and discussed at length resulting in policy implications. Comparing on the other hand the emerging future issues with current sustainability indicators disclose gaps in the monitoring systems.

Findings – There is a clear and growing need for the ability to anticipate change to be embedded in policy. This is critical not only to be able to respond and adapt to new situations before they occur, but also to shape the future, building upon mutual understanding and common visions to be jointly pursued. For policy responses to address current global challenges, especially when seen separately from one another, is clearly a demanding task and all the more so when the policy focus extends beyond the challenges facing societies today, seeking to anticipate future challenges and transform them into opportunities. Therefore, key issues were grouped into overarching challenges with a global scope, but requiring action at EU level, to meet for instance the needs to change current ways in which essential natural resources are used, and the needs for more effective and transparent governance for the EU.

Research implications – In addition, we can see that most of the highlighted issues are well reflected in the sustainability indicator systems which helps policy-making to understand where unsustainable trends need to be corrected or prevented.

Practical/managerial implications – But it shows also, where data collection has to be enhanced to monitor future highlighted issues nowadays still lacking in the indicator systems.

Public Policy Implications – In the main EC Communication on the Innovation Union, the future societal challenges were taken from the final publication of the foresight study discussed here. Besides, an increasing need for the EU has been detected to strengthen its ability to anticipate future challenges to turn these into new opportunities so as to position itself within adaptive and dynamic global institutions. Another implication is the need for greater policy alignment towards sustainability calling for flexible policy structures to address upcoming cross-cutting challenges.

Originality/value – The foresight approach employed in the presented study contributes to policy-making by supporting a continuous and shared approach to understand the present in all its complexity, to look at different future possibilities and to shape a joint direction to follow, considering different stakeholders' points of view. Coupling this with a periodic evaluation of what has or has not been achieved, e.g. by means of sustainability indicators, enables policy to correct deviations and to continually adapt to and reshape upcoming new situations. Such an approach, linked to other forward-looking techniques and tapping into evidence-based research and quantitative elements, would be critical to enable policy-making to become more adaptive and able to anticipate and address change towards sustainable development.

Keywords – Foresight, horizon scanning, future emerging issues, sustainability indicators
Paper type: Research paper

SESSION 12 – Foresight and Public Policy

Futures studies and uncertainty in social-ecological systems

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"Social-ecological systems" are society and ecosystems viewed as interdependent with no clear boundaries - dynamic, complex and unpredictable. In facing and dealing with uncertainty, the futures studies field and the study of social–ecological systems meet. The subject areas on which methods are applied and perhaps the framing of the problems may diverge, but there are connections and potentials for cross-fertilization. In this paper, uncertainty in social-ecological systems is explored as one theoretical basis for futures studies.

The paper reviews perspectives on uncertainty in social-ecological systems and the relation to futures studies. The aim is to explore these theories and the implications of using them as a basis for futures studies. The methodological approach is a review of mainly scientific literature.

It is important to understand and clarify different theories and perspectives in futures studies, both for the research field's further development and also for society as a whole. The products of futures studies research are spread and influences society, and it is important to reveal what assumptions and values these are based on. Many different theories and perspectives are used explicitly or implicitly in the futures studies field, without being thoroughly reviewed or understood as a theoretical basis.

The paper discusses three kinds of uncertainty. One is uncertainty due to insufficient or unreliable knowledge. Such uncertainties can be viewed as feedback that are either masked (not detected or transferred in the current institutional setting) or disregarded (not acted upon, despite the fact that it is perceived). Another is uncertainty due to complexity, variability and dynamics in social-ecological systems. Social and ecological systems are so complex that the knowledge about them will never be complete. A third is uncertainty due to conflicting ways of understanding a system or a problem and diverging assessments about which solutions to apply and how to prioritise.

Neglecting the fact that change occurs may reduce the adaptive capacity of social-ecological systems. Hence we need to both reduce uncertainty about the dynamics of these complex systems but also learn to cope with changes that cannot be predicted. Futures studies represent a means of formulating possible and preferable futures, which can address uncertainties and enhance preparedness for the unforeseeable and unexpected. Uncertainties are present in social-ecological systems. In order to be resilient, management in these systems has to address those uncertainties, both in terms of difficulties and potential, understand them better and develop strategies to deal with them.

SESSION 12 – Foresight and Public Policy

A Comparative Study of Governance Structure for Policy Foresight

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Purpose - The overall aim of this research is to present a theoretical framework on the characteristics of governance structure for foresight-based policy development. This research examines the incentives of political institutions, the power structure, and the process of policy foresight in different countries so as to identify the common ground in the governance structure for an effective implementation of policy foresight.

Research Issues - Given the short-term nature of democratic governments and the functional mindset of officials, how can a long-term oriented foresight research be initiated, supported and linked with policy making process? What are necessary institutional arrangement for policies supported by foresight research be carried out when no obvious parameters indicating significant deviation is warranted? How can these policies be accepted and continued even with change of governments? How to create institutional incentives so that succeeding governments are more willing to continue the same foresight policies initiated by previous governments? All these questions are important for foresight research become institutionalized for policy formulation and implementation.

Design/methodology/approach - This research adopts a comparative analysis approach to examine the governance structure of foresight policy development in UK, Japan, Korea and Taiwan. UK and Japan have the parliamentary system while Korea and Taiwan follow the presidential system. This research develops a framework of important dimensions that affect the results of foresight policy development and implementation. We would analyze the commonality of governance structure as well as unique aspects across these countries.

Findings - Our initial findings suggest that, regardless the form of government organizations, it is critical to have a designated organization in the governance structure that has the mandate to demand the executive branches to provide foresight research in important policy areas. It is also necessary to have credible research institutions (or think tanks) that can carry out such research. Research funding should be on a multi-year time frame (or a rolling basis) rather than an annual time frame. Policies developed with foresight research should be assigned with certain priorities and integrated with overall government policies. Monitoring mechanisms should be established to follow up or evaluate the progress of policy implementation with suggestions for subsequent modification of foresight activities.

Research Limitations - This research sheds light on the governance structure of foresight policy development in four different countries. There are limitations in terms of general inference that can be derived from this research. It would be interesting to add other types of government in the follow-up research, for example, the emerging countries, to analyze the linkage of foresight and policy implementation due to different policy making structure.

Public Policy Implications - This research provides an analytical framework and evidence for governments to evaluate or develop their governance structure for foresight policy development. When facing with many long-term challenges, it is imperative that governments take a long-term perspective to adjust their priorities and allocate national resources to respond to these challenges. A more rigorous approach to review and design their governance structure will lead to more effective implementation of policies with solid foresight. The findings of this research suggest a variety of approaches taken by different countries and their common basis. It offers several models for policy makers to contemplate the adequate ones for their countries to adapt to.

Keywords – Foresight research, foresight policy, policy research, governance structure
Paper type - Research paper

SESSION 12 – Foresight and Public Policy

On the future of global governance: what will be left of the Bretton Woods legacy in two decades

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The EC is working on a new Lisbon agenda for 2020. Major changes will by then be already on their way regarding the place of Europe in the world, mainly resulting from the rise of emerging countries, especially of India and China. The institutionalisation of the G20 is already a major sign of transformation.

In the following round, namely 2030, which is our time horizon here, the transformation is bound to be on an even larger scale. Demography and relative magnitudes of GDP and trade flows will by then reveal very clearly the large shifts that may occur in the distribution of power. It remains very likely that the world will still be largely interconnected, even if the rules of these interconnections, be they trade flows, migration or scientific and cultural exchanges, will have deeply changed in the meantime. The figures of global governance will thus be a major structuring component of our future world.

We can investigate what these figures could be on the basis of some of the current debate as global governance is already addressed along lines which are likely to last, marked by major events such as the fall of the Berlin wall and the demise of the communist alternative, the attack of September 11 and the threat of an internationalized terrorism, the 2008 major financial crisis at the heart of a globalised financial system and a growing concern over a by now obvious climate threat. In this context, which forward looking approach to global governance should be taken? Clearly the precedent of the Bretton Woods conference reshaping a large part of the international relations constitutes an obvious reference point. But Bretton Woods has then to be considered in a comprehensive way, including most of the rethinking which established the goals and values of international institutions. This legacy then includes all the statements that from the Philadelphia declaration to the charter of Havana presided over the creation of major international institutions, which remain central elements in today's discussions on the future of global governance.

Discussing the future of this whole legacy is an obvious starting point which immediately points to the differences, the first of which is that the momentum for such large restructuring of international relations stemmed from the horrors and destructions of the second world war. Indeed it is a major factor but one should not forget that the first step in this process was in fact taken in the aftermath of the first world war, with the creation of the League of Nations. It remains the case that the reaction to the second world war helped to impose some values, clearly reflected in the official statements mentioned above.

We shall not retain the idea that a major global conflict could be the stimulus for new figures of global governance. In our investigations of the possible future schemes of global governance we shall try to sketch the values, constraints and power relations that could help to shape the new features. The strategies of adjustment of existing international institutions are part of the factors of changes. Also of importance should be the developments in the constellation of Civil Society Organizations which have become global actors. In addition to the actions of states and markets to shape the future of global governance CSOs and international institutions will have their say.

Our paper will try to map out these potential future developments within a set of alternative configurations.

SESSION 12 – Foresight and Public Policy

Futures in *Futures* - an investigation of the role of work in futures studies

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The aim of this paper is to give an overview of and a discussion about the topic of 'work' and to what extent it is present and how it is dealt with the journal *Futures* between 1995-2010. This will be carried out by an investigation how themes as labour market, organisation and management are covered in the journal and what kind of futures research they represent.

The examination is done in a stepwise manner. In the first step we identify relevant articles about work, then we classify them by theme, thereafter we decide whether they make forecasts or not. In the final step the articles orientation is determined by dividing them into either theoretical oriented articles or practical oriented. Besides these logical steps taken the article also contains a discussion of the characteristics of these articles and further relates these findings to traditional work life research within the social sciences. The paper should not be seen as ready for publishing, but rather as research paper in progress.

Our main findings are that there is an absence of work in futures studies, and when work is present in the articles there is instead an absence of futures.

SESSION 13 – Technology Foresight 2

Taiwan Agricultural Technology Foresight 2025

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Purpose – Confronting the challenges of WTO, globalization, climate change and knowledge-based economy, Taiwan government, the Council of Agriculture (COA), attempts to revitalize agriculture and therefore entrusts the project, *Taiwan Agricultural Technology Foresight 2025*, to Taiwan Institute of Economic Research (TIER). The project is four-year from 2008 to 2011, with average budget $350 thousand dollars annually, including foresight activities such as demand survey, trend and policy analysis, horizon scanning, scenario, bibliometrics, essays (competition), workshops, two-round Delphi, and roadmapping. This paper is aimed to introduce the framework of the project and to analyse the major part of the project based on the expert opinion by large scale Delphi survey.

Design/methodology/approach –TIER set up a task force from 2008 to build up the database including social needs, technological trends, research resources, critical issues and agricultural policies nationwide and worldwide. Under the support and approval of COA, the project set up the Planning Committee of 17 members, including government officers, agricultural experts, senior research fellows, social scientists and one economist. The Planning Committee decided that the target year of the project is 2025, and that the function of the foresight is to meet the long term objectives for agriculture.

In order to link the foresight and policy, the project set up the Strategy Formation Committee, divided by 10 sub-committees, corresponding to the 10 research areas of COA, each of which is made of 4 agricultural experts and senior scientists. The members of the Strategy Formation Committee are nominated by the Planning Committee and approved by COA. The duty of the Strategy Formation Committee is to depict 2025 scenario and to figure out the research topics to meet the long term objectives for agriculture in Taiwan.

In 2009, the Strategy Formation Committee proposed more than 100 research topics for *Taiwan Agricultural Technology Foresight 2025*. TIER task force tried to rewrite the research topics in a uniform format and to integrate some of the research topics. The Planning Committee decided the final 74 research topics and the key questions as the main part of Delphi questionnaire.

In 2010 TIER task force executed two rounds of Delphi survey of *Taiwan Agricultural Technology Foresight 2025*. The first round investigated 675 experts and scientists, 546 of which participated (response rate 80%). The second round investigated 546 experts and scientists, 413 of which participated (response rate 76%).

Findings –Based on the survey responses to 74 research topics, the project compiled the indices of industrial development, life quality, environment protection, national priority and government support to measure the research topics in different aspects. The survey shows that the government should support those research topics with higher ratings in environment protection and in life quality due to externality. It is, however, slightly correlated between industrial development and government support to be need for those research topics because some of them could be developed by the private sector.

Keywords - Technology Foresight, Delphi, Agriculture

Paper type: Research paper

SESSION 13 – Technology Foresight 2

Routes for Enhancing Corporate Foresight Capabilities in Small and Medium Sized Enterprises

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Purpose – The purpose of this paper is to contribute to theory building by providing a framework of organizational SME capabilities for effectively achieving value associated with corporate foresight (CF). This conceptual paper is based on two major shortcomings in the existing body of knowledge. First of all, empirical research on CF activities has so far been limited to research in large companies, while foresight related activities and capabilities of small and medium sized companies (SMEs) have stayed below the radar. Secondly, CF systems have proven to be difficult to implement due to lack of enabling factors within organisations. These gaps constitute a point of departure for the proposed paper.

Design/methodology/approach – The paper reviews relevant literature both on conceptual issues and experiences in relation to corporate foresight. It focuses on confronting and integrating the Granovetter's theory of weak tie networks, literature from the strategic thinking, dynamic capabilities and the resource-based view (RBV) of the firm, and existing CF research, including the Rohrbeck's corporate foresight maturity model, to develop a conceptual framework of foresight capabilities in all types of companies, including SMEs.

Findings – In this paper it is perceived that effective CF can be organised in small and medium sized enterprises without a process model but with certain organisational capabilities. The proposed framework of capabilities allows companies choosing between different routes to achieve value associated with CF: institutionalised foresight route, organizational culture route, and a networking route. Required organisational capabilities are proposed for companies to benefit from engaging in a weak ties network. The findings suggest that the work in CF field can be theoretically supported in combination of management theories and network theory.

Research limitations – The research results outlined are only a first step in the exploration of foresight capabilities in SMEs. In terms of theory the proposed framework needs to be more thoroughly tested and validated in empirical settings.

Research implications - The proposed capabilities framework can be used for improving management systems and advancing foresight practices in all companies, including SMEs. The research paper proposes ways to integrate CF into existing management functions and to enhance SMEs abilities to survive discontinuous change.

Originality/value – This paper is an attempt to theoretically support the relevance of corporate foresight capabilities in SMEs. It extends the theoretical basis by linking CF to strategic management and network theory literature. The proposed framework broadens the understanding of corporate foresight by describing it as an organizational capabilities framework as opposed to CF as a process model or a set of certain methods. The framework is applicable to all types of companies.

Keywords – Corporate foresight, weak signals, foresight capabilities, small and medium sized enterprises, network theory.

Paper type: Conceptual paper

SESSION 14 - Applications

Identification and Evaluation of Future Trends in the Fast Moving Consumer Goods (FMCG) Industry using a Real-time Delphi

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Purpose: It is crucial for a company's long term survival and competitiveness to be innovative and adaptive. In addition, companies have to engage in long-range planning activities to prepare for future developments. Thereby, relevant trends which might be faced in the future have to be identified and evaluated regarding their estimated impact.

Despite the high importance of long term planning for a company's success, we found insufficient research on this topic regarding the fast moving consumer goods (FMCG) industry. We aim to contribute to this lack of research and provide in depth analysis on the future of the European retail sector – an industry with a market size of more than USD 3 billion in 2010.

The purpose of this paper is to provide strategists and decision-makers with a scientifically sound identification and evaluation process for upcoming trends in the FMCG industry. We demonstrate how relevant trends in the FMCG industry have been identified and evaluated using an innovative real-time Delphi approach.

Design/methodology/approach: In order to develop a plausible categorization of the presented trends, a real-time Delphi study has been conducted, in which 82 designated experts from the FMCG industry participated.

We identified 16 relevant industry trends focussing on cooperation, customers, competences and supply models for the FMCG industry in 2030. Trends were evaluated by our participating experts applying an innovative real-time Delphi approach. Experts assessed each projection, i.e. future thesis, on its probability of occurrence, impact on the FCMG industry, and desirability. Besides, experts provided 1,197 qualitative reasons for all answers.

Findings: Analysis of the expert-based trend evaluation in terms of probability of occurrence, impact, and desirability allowed clustering trends in three categories: high-impact prospects, medium-impact expectations, and eventualities. High-impact prospects are likely to occur and have a high impact on the industry, while medium-impact expectations have both a medium likelihood and impact. Eventualities are neither probable nor momentous, however, must not be neglected but continuously monitored in strategic planning.

Strategists in FMCG companies should consider the trends in their strategic agenda according to this categorization. Thus, capabilities are developed in respect to probable future challenges.

Research implications: The real-time Delphi method has not experienced wide application yet. Therefore, the use in the FMCG sector is a novel approach.

Practical/managerial implications: The obtained data reveals that three categories of trends can be identified for the FMCG industry. Strategists should include trend evaluation on their strategic agenda and include them in strategic planning. We provide a reproducible approach to identify and evaluate trends which can be included in such strategic planning activities.

Originality: Our literature review revealed a lack of futures studies in the FMCG industry. Only a handful of practitioners' papers are dealing with possible developments in this area. With our research results we therefore contribute to the few trend studies in retail business.

Keywords: Consumer goods industry, trends, strategy, Real-time Delphi

SESSION 14 – Applications

Results of Real-Time Delphi

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SESSION 15 – Foresight in Russia

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National Science and Technology Foresight in Russia: Outcomes and Prospects

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Purpose: The purpose of the paper is to present the latest practices of S&T Foresight in Russia, analyse its outcomes and discuss activities planned for the future.

The transition of the Russia's transition to the market economy had a profound impact on the National innovation system. Nor organizational reforms, neither increasing budgetary R&D funding were able to increase international competitiveness of the Russian S&T sector. Under these conditions S&T Foresight is considered as one of the instruments to identify thematic and institutional S&T priorities and facilitate effectiveness of the policy instruments aimed at modernizing the NIS.

Design/Methodology/Approach: The first Foresight studies in Russia were aimed at identification of thematic priorities. The Priority S&T Areas and National Critical Technologies approved by President of Russia in 2006 were used as a means to structure and prioritise the National S&T Programme – the key source of funding for applied R&D. This exercise was repeated in 2009-2010 and resulted in the revised and more concise lists of priorities and Critical Technologies signed by President of Russia in 2011.

In parallel, there were implemented two large scale National S&T Foresight projects. The first of them – targeted at the horizon of 2025 – included a large-scale Delphi survey and a number of interrelated macroeconomic and sectoral forward-looking studies. Numerous reports and policy recommendations were used as a background for national programmes for socio-economic development and a number of sectoral strategies whereas the most important intangible outcome was related to interaction between experts from S&T, companies and government agencies and building more sustainable Foresight culture. The next project – S&T Foresight: 2030 – was aimed at identification of areas to initiate technology-enabled large-scale projects targeting new markets and being able to use domestic R&D capacities. Formal lists of "technology packages" were complemented by sectoral scenarios and relevant institutional and technological options for decision making. A broad discussion of the results has facilitated creation of sustainable expert networks and to a large extent provoked increasing interest to Foresight activities at large Russian companies.

Findings: Foresight activities aimed at S&T and innovation are increasingly important for development and implementation of relevant policies. To increase performance of Foresight and socio-economic return on R&D investment it is needed a complex approach aimed not only at direct (tangible) output but even more at longer-term institutional changes, a higher level of overall Foresight culture and networking effects.

Policy implications: A number of lessons learnt from the previous practices (lack of interdisciplinary activities, weak links with current S&T policies, no systemic work with experts from government and business at early stages of the project, et al) were taken into account while planning the new round of S&T Foresight to be implemented in 2011-2013. The major idea is to make Foresight much closer related to the latest instruments of S&T and innovation policies, like technology platforms, building R&D and innovation capacities at leading universities, pursuing innovation activities at large companies, bridging the gap between universities and industry et al.

The new policy instruments will increasingly incorporate Foresight tools. The largest state-owned companies already use Foresight to formulate priorities for their Programmes of Innovation Development. Newly established technology platforms started developing their Visions and Roadmaps identifying principal milestones, barriers and risks. Forward-looking activities have been initiated by Skolkovo Foundation, RUSNANO Corporation and a number of other public and private organizations.

To build new capacities there has been established a network of Foresight centres at the leading Russian technological universities, which is supported through the government programme for development of universities' innovation infrastructure. The networks will also provide monitoring of technology trends in particular areas and a more systemic involvement of private businesses in Foresight studies, thus bridging the gap between key NIS stakeholders.

Originality / Value: The paper presents and discusses outcomes of the earlier Foresight programmes in Russia, and future activities planned for Science and Technology policy making.

Keywords: Foresight, Russia, STI priorities and policy.

Paper type: Research Paper

SESSION 15 – Foresight in Russia

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Foresight and Roadmapping Backgrounding Public and Private Innovation Strategies: Approach of the HSE

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Purpose – The HSE Foresight Centre implements a series of research and applied projects intended to roadmap future patterns for different sectors of economy. The most promising projects in this field are designed for corporate customers (the Russian Corporation of Nanotechnologies, major Russian state-owned companies etc.) and public authorities (the Ministry of Education and Science, etc.). The purpose is to identify prospective market and technology trends in the middle- and long-run (2020-30) and to use them as blueprints for optimal innovation strategies.

Design/methodology/approach – The HSE uses multi-methodology Foresight approach for roadmapping: integration of desk research, expert procedures and scenario writing. The framework is determined by the integrated roadmap that highlights priorities for further development of innovation products, technologies and services.

Findings – The integrated roadmap incorporates technology roadmap which interrelates most prospective new products, technologies and R&Ds into business map that depicts alternative market patterns for these products and technologies. The HSE roadmaps provide scenarios of research area development; consider commercial perspectives of innovation products and technologies and provide innovation strategy for customers. Their application part includes programmes for R&D, for implementation and commercialization of future-oriented technologies and products.

Research limitations – Market perspectives of future-oriented technologies can hardly be estimated by methods of traditional quantitative forecasts based on previous observable data. Irrelevances of conventional methods together with insufficiency of generally accessible data themselves hinder assessment of emergent markets. New heuristics based on wide-ranged expert methods are up to the challenge.

Research implications – The HSE develops fundamentals and methods of roadmapping in areas with short previous market trends or no market history at all. It proves to be effective in future-oriented technology fields, especially in breakthrough cases that lead to disruptive changes.

Practical/managerial implications – The HSE roadmaps have promising practical application for investment project-making and for project appraisal in the field of innovation products as it provides both technological and commercial validation of multiple-choice alternative chains «R&D – technology – product – market». Comparative studies of these chains generate concrete strategic options including tecnology/product specifications; comparative advantages over analogues; benefit-giving properties; future-oriented fields of application; expected market demand.

Public Policy Implications – The HSE roadmaps could help the government and public companies to array strategic priorities for their research and technology policy in the field of new technologies in view of scenario-related international, national and industrial technological and market developments. The roadmaps also highlights practical measures of government support for selected priorities, e.g. calls for projects and/or target project finance.

Originality/value – The HSE roadmaps are outcomes of the first large-scale national Foresight exercises in the field of public and corporate innovation perspectives.

Keywords – Foresight, Roadmapping, Nanotechnologies, Innovation strategies, Scenario analysis.

Paper type: Research paper.

SESSION 15 – Foresight in Russia

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Assessing national Foresight studies – an approach to make Foresight studies comparable

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Purpose – Conducting national Foresight studies has become common in many countries. However the impact of such studies on the performance of the national innovation system remains unclear. The paper therefore assesses the impact of more than thirty national Foresight studies.

Design/methodology/approach – To ensure comparability of the different Foresight studies an evaluation model was developed. All considered national Foresight studies were assessed according to a set of criteria: the value added of Foresight/implementation, the meaning / position of initiators / motivation of Foresight, stakeholder involvement, assigned resources, experience level, instruments applied, the context of the Foresight and the degree of independence of the responsible institution. These criteria are complemented by respective scales to allow assessment. Each indicator was given equal weight to compose a final aggregate indicator expressing the performance of the national Foresight study. National and / or regional characteristics as well as the context in which the national Foresight study is embedded are considered in this assessment approach.

These criteria were used to assess national Foresight studies in the OECD-/ ERA countries conducted in the last years. For each country the most recent national Foresight study was assessed. The assessment is based on information publicly available, additional telephone interviews with responsible Foresight study managers, written survey as described and evaluation reports of national Foresight studies. From this variety of information valid conclusion can be drawn to the performance and the impact these studies achieved.

Findings – The analysis shows that Foresight studies have a clear effect on the process of defining research, technology and innovation policies. The results of Foresight studies are therefore frequently used for policy definition and the supporting measures. Likewise the science and technology infrastructure is built and shaped based on Foresight study results. There exists a strong positive correlation between the use of Foresight studies and the innovation performance of a country. Countries which have rarely or only half-heartedly professionally carried out these studies could not achieve the required results. By contrast, countries that adopted a consistent and coherent approach to initiating, planning and carrying out Foresight studies as well as to subsequent implementation experienced a high degree of acceptance of Foresight study results. This acceptance is crucial for successful implementation of identified measures and enables countries to secure lasting scientific, technological and innovative growth.

Experience in most countries has shown a positive effect on research (science), technology and innovation in the countries concerned. At the same time, incorrect estimates have resulted from Foresight studies and this would be an argument against establishing such Foresight study processes to begin with. A key factor seems to be that all participants in a national innovation system need to believe in the process and be in favor of it. Depending on the various interests at stake, there is also the possibility that, as the process unfolds, existing "ownership" will be called into question and some institutions or individuals will feel as if their turf is being encroached upon. Such a process should therefore be understood and perceived as a means to spur governments to prepare society for the future in a targeted manner. It is equally important that a wide range of stakeholders be involved in the process and that the public be made aware from the very outset of action taken to implement Foresight study results.

Research limitations – The proposed model covers a broad range of national Foresight studies characteristics. The scales used are rather qualitative so far thus certain subjectivity in assessment is inherent. The eventual, long-term benefit of Foresight studies cannot yet be validly proven scientifically.

Research implications – the assessment model is a first step towards development of taxonomy of Foresight studies and the deviation of impacts of such. However the work needs to be done to make the assessment criteria and the assessment procedure more transparent and exclude any potential subjective evaluations.

Practical/managerial implications – Earlier assessment efforts of Foresight studies did not take the whole spectrum of possible implications into account. Moreover such assessments were typically related to individual studies assessment rather than suitable for comparison of different national Foresight studies globally.

Public Policy Implications – the proposed model provides valuable insights for policy makers in course of the design of Foresight studies to achieve the best output possible.

Originality/value – There is a lack of work on taxonomy and evaluation of national Foresight studies, a
challenge which this work has taken up on.

Keywords – National Foresight studies, impact assessment.

Paper type: Research paper

SESSION 16 – Foresight and Futures Thinking

Exploring the future with complexity science: The emerging models

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The 'Futures Field' can be divided into five major segments or futurist schools, together with their complementary but differing research methodologies and time horizons. Both *Environmental and Geosciences* and *Infrastructure and Socio-technological Systems* are grouped within 'Futures Research' because of their system science orientation. 'Futures Studies' has a social science orientation, and it embraces both *Social, Political and Economic Science* and also *Human Life, Mind and Information Science*. Finally 'Foresight' is the term used by government and within *Business and Management Science*.

The evolutionary sciences, such as astronomy, geology, ecology, anthropology and archaeology have an historical evolutionary path, in which a series of events have been interpreted retrospectively into a pattern to provide an explanation of the phenomena. The same evolutionary processes will also create the future, and it follows that futures research is in fact an evolutionary science. Complexity science, or the science of evolution and complexity, can be applied within each of the futures field segments to contribute to a theory of futures research.

1. Environmental and geosciences treat the Earth and its various components as typical out-of-equilibrium systems with dissipative processes. In ecology the methods and models of non-equilibrium thermodynamics have been applied to ecosystems in which the system growth parameter 'exergy' (the available work content in energy) drives the system away from equilibrium and is destroyed in the irreversible process of evolution.

2. Infrastructure and socio-technological systems emerge through the diffusion of investment capital, with the endogenous transformation of the urban system. Investment capital is the system growth parameter that has the equivalent properties to 'exergy' in the civil system and drives it away from equilibrium with the creation of spatial structure. The evolution of the world system of cities plays a central role in the emergence of civilisation. The qualitative evolutionary driver of the system is the increase in planning standards and the physical quality of life that correspond to the stages of development.

3. Social, political and economic sciences share 'methodological individualism' as a dominant paradigm with the explanation of social phenomena from individual rationality rather than instinctive behaviour. The human being plays a part in the evolution of emergent complexities, not only as a biological but as a psycho-social being too. Social emergence may be described by means of agent-based models and also by civil phase transitions.

4. Human life, mind and information sciences are evolving with the development of complexity models in neuroscience, immune systems, epidemic modelling, social media technologies, artificial intelligence and transhumanism.

5. Business and management science involves examining the viability of successfully undertaking transactions in a complex adaptive system, in which the systemic structure evolves over time. The pay-off or stimulus for successful transactions is the capture of investment capital (business profit or domestic savings) so that the household or establishment can grow and reproduce. Geographical information systems are integrated with agent-based modelling for corporate foresight.

SESSION 16 – Foresight and Futures Thinking

Foresight and futures studies: the influence of criticality and cognition

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The paper spotlights behavioural and cognitive matters that are fundamental to foresight and futures studies though they are mostly ignored, presenting foresight and futures studies as abstract ideas. The paper begins by asking 'Are foresight and futures studies synonymous?' No, they are not, though careless use of the terms often confuses or conflates the two words. In English foresight is 'anticipation or care for the future or the muzzle sight of a gun' - futures studies are something else that will be revealed. Foresight is anticipation, appreciation, which includes numeracy, and learning, to reveal dynamic cascades of situations composed of interacting elements, a form of engine. Foresight involves transitions from conceptual thinking via its perceptual counterpart into representation in physical space in the form of ideas and artefacts. Some may be feasible immediately but many of the possibilities will lie unrealized into an indeterminate future. Similarly, agglomerations of possible and feasible ideas, and artefacts, may be individually or collectively of immense real or potential *value* while being *priceless*. In this context undifferentiated lists of 'happenings' that emerge from over the horizon scanning are *valueless*. Foresight then involves both individual opinions and aggregates of them that are subjective because they are based on pattern recognition and all that goes with it: attempts to present foresight in other terms are deeply flawed. The notions of *criticality* and *ignorance* flow naturally from pattern recognition.

By contrast 'futures studies' are often proclaimed to be pictures of the future painted to provide 'understanding' of 'the future' often through multiple pictures rather like an animation projected at a particular time horizon. In a sense the outcome is a 'market' of pictures each of which has an associated *cost* of achievement and a *price* to purchase in which the costs and prices are in many different forms aggregated into what is often, and inappropriately called the *preferred future*. The *fitness for purpose, valuation and risk* associated with the preferred future may or may not be part of the futures study which is inevitably an attempt to place a *cognitive value* on something that does not exist and is unknowable.

The utility of a futures price depends on a belief that the outcome is unknowable at a particular point in time; otherwise the market is rigged (i.e. preferred). More importantly the product of a futures market is constantly incorporating new information and new judgements that determine the prices at which futures trades are made. Is foresight then simply locked into a descriptive phase that lacks both the flow of information, diversity of judgement and value in monetary terms to develop a strong theoretical justification? If the purpose of foresight is to anticipate complex situations that are not readily reduced to simple price levels, then can hypotheses about these complex situations be validated, through the replication of studies in different places and/at different times? The latter is an issue raised by Bimber & Popper (1994) in their discussion of *criticality*. A signpost to how these and other processes might work lies in new understandings from cognitive science of how the brain has evolved means of modelling current situations to assess utility and risk and act accordingly. How such ideas can be applied to futures studies will be examined to provide some principles for designing supportive information systems.

Both foresight and futures studies attempt to portray how the exquisite interaction between society, emerging science and technology (EST), economics, ecology, politics and human values mould the emergence of ways of living, a metaphor long in evidence and capitalized upon in the long wave theory first developed by Kondratieff (1923). Ought governance to be part of a futures study? Without adaptive behaviour, governance becomes virtually impossible promoting foresight and futures studies to a case by case phenomenon. Governance, must engage with these

dichotomies. Human values and the dynamism of norms infect the evolution of governance: they shape the challenges faced by current and future societies. Can sustainable human societies evolve within the Earth's complex living system? Should governments' attempts to manage the world be revealed as either misguided or a collective deception? Ought governance to encourage or hinder the emergence of disruptive ESTs? Or is governance part of a bureaucratic mind-set relating to ESTs, and to ways of controlling, and influencing social needs that shape them? How effective are foresight and futures studies in coping with the co-evolution of technology and society? a pivotal matter as artefacts move toward greater and often hidden complexity when governance favours sustainable development. These are some of the matters where cognitive and behavioural phenomena have much to offer.

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SESSION 17 – Integral Futures Studies
Organizer: Dennis Morgan, dynamorg@yahoo.com

The Application of Integral Theory to Futures Studies

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Purpose – to show how the integral framework can be applied to futures studies

Design/methodology/approach – The design and approach is through an understanding of Ken Wilber's four quadrants, which are able to incorporate multiple futures methodologies

Findings – The integral futures (IF) framework is found to be a valuable theoretical and analytical tool for clarifying images of the future; it shows lines of development within each quadrant and interactions between quadrants, illustrating the effectiveness of the four-quadrant approach.

Research limitations/implications – The IF framework is best used as a way to obtain a greater understanding of global futures, illuminating the ''global problematique'' and the way forward towards an integrated vision of the future. Because it is theoretical, experimental, and evolutionary, incorporating subjective as well as objective modes of interpretation and analysis, it cannot be reduced to strict empiricism.

Practical implications – This approach to futures/foresight studies broadens the range and offers more depth to conceptions of the future, so it should help to develop/improve futures methodologies/practices in general beyond strict empiricism and post-structuralism.

Social implications – Through civilizational critique and integral reconstruction of images of the future, social evolution is more thoroughly understood and unprecedented social change is implied.

Originality/value – This presentation should help futurists to see and interpret the ''bigger picture'' of civilizational futures through revealing the ''crack'' of the modern image of the future, how this crack relates to the current world crisis, and what is needed to heal the crack so that a new vision of a preferred global future can emerge.

Keywords - Integral, Civilization, Society, Global Futures, Social Change, Philosophical Concepts

Presentation Type – Conceptual/Theoretical Research Paper

SESSION 17 – Integral Futures Studies

Organizer: Dennis Morgan, dynamorg@yahoo.com

Making Headway During Impossible Times – Integral Solutions to the Global 'Mega-Crisis'

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Purpose: The purpose of the paper is to illuminate the Global Mega Crisis (GMC) through the use of an integral futures perspective thus opening up promising new options.

Method: A critical comparative method is employed in two main ways. First, the paper reviews and evaluates key characteristics of perspectives widely brought to bear on the GMC. Second, an integral perspective is used to illuminate what are termed 'domains of generic solutions.' These are proto-solutions that need to be worked out in greater detail in a wide range of social and cultural environments: there is no 'one size fits all.'

Findings: Perspectives commonly brought to bear on the GFC share a number of common assumptions and associated pitfalls. Among the former are an over-emphasis on the efficacy of technology *per se* and the widespread use of unexamined cultural presuppositions (e.g. growth, human dominance, use value over intrinsic value). Proto-solutions that emerge from an integral analysis help us to shift attention from the exterior 'downstream' results of interior states and stages back to their sources. Clarity about those sources (e.g. in worldviews, values and restrictive stages of human and cultural development) illuminate both the disaster-prone trajectory of Western civilisation as well as pathways beyond it. Hence the grounds of more tangible and better grounded solutions become clearer and more widely accessible.

Research limitations/implications: Since integral perspectives are fairly new and at times misrepresented, their use should be seen as part of a medium term strategy, rather than one that can be immediately implemented. Equally, such perspectives provide greater clarity about systemic shifts toward wiser and more sustainable cultures.

Practical implications: The perspective outlined here facilitates the emergence of action learning communities of many kinds that are better equipped to understand deal with the 'wicked problems' that have emerged during the currently 'impossible times.'

Originality/value: The paper offers tangible hope to a world sliding into profound and systemic crisis. It provides a way to reinterpret and moderate what are currently described as 'overshoot and collapse' scenarios.

Paper type: Integrally informed critical analysis and recommendations.

SESSION 17 – Integral Futures Studies

Organizer: Dennis Morgan, dynamorg@yahoo.com

An 'honourable' approach to futures inquiry

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This paper explores the use of the integral framework as a response to the criticism that the Foresight and Futures Studies field lacks a core set of basic terminology and models.

It does not suggest that the integral framework should become the core set; rather, it suggests that an orientation approach that can manage multiple sets of terminology and models might better fit the discipline. Within such an approach then sets of reliable, valid, and reproducible methods for conducting research in the field of Foresight and Futures Studies can be located. Furthermore, through this approach, methods that seek breakthrough thinking, inspiration, and hope can also be located.

Finally this approach can also suggest how such a spectrum of approaches can be honoured appropriately.