

Foresight for Dynamic Organisations in Unstable Environments

A Search for New Frameworks

Edited by
**Sandro Mendonça and
Bartolomeo Sapiro**

First published 2011
by Routledge
2 Park Square, Milton Park, Abingdon, Oxon, OX14 4RN

Simultaneously published in the USA and Canada
by Routledge
711 Third Avenue, New York, NY 10017

Routledge is an imprint of the Taylor & Francis Group, an informa business

© 2011 Taylor & Francis

This book is a reproduction of *Technology Analysis & Strategic Management*, volume 21, issue 3. The Publisher requests to those authors who may be citing this book to state, also, the bibliographical details of the special issue on which the book was based.

All rights reserved. No part of this book may be reprinted or reproduced or utilised in any form or by any electronic, mechanical, or other means, now known or hereafter invented, including photocopying and recording, or in any information storage or retrieval system, without permission in writing from the publishers.

Trademark notice: Product or corporate names may be trademarks or registered trademarks, and are used only for identification and explanation without intent to infringe.

British Library Cataloguing in Publication Data

A catalogue record for this book is available from the British Library

ISBN 13: 978-0-415-67223-8

Typeset in Times New Roman
by Taylor & Francis Books
Printed and bound by TJI Digital, Padstow, Cornwall

Disclaimer

The publisher would like to make readers aware that the chapters in this book are referred to as articles as they had been in the special issue. The publisher accepts responsibility for any inconsistencies that may have arisen in the course of preparing this volume for print.



Foresight for Dynamic Organisations in Unstable Environments

Foresight has an especially important role to play in times of trouble and transition. When turbulence and radical uncertainty are the framework in which organisations operate, it arises as a tool for intellectual freedom and enhanced strategic leverage. But foresight itself is always in a continuing process of innovation, as it is not detached from the changing environment that engulfs decision-makers and stakeholders. Taking stock of recent developments in foresight methodologies and implementation experiences has now emerged as an urgent task as new experiments accumulate in the twenty-first century. Looking ahead calls for both a review of contemporary perspectives and innovative practices in foresight methodology, and for salient experiments on how foresight is embedded in organisations.

This book brings together real-world cases and conceptual proposals to bridge the gap between practitioners and researchers in the field of futures research. Such an ambition is an increasingly difficult balancing act as the gap between the needs of organisational leaders and the incentives of academics becomes an ever widening gulf due to increasingly specialised and self-absorbed agendas. An international team of authors from a wide variety of backgrounds come together in this book to provide first-hand views from the frontier of empirical work and theoretical reflection on foresight.

This book was originally published as a special issue of *Technology Analysis & Strategic Management*.

Sandro Mendonça is a lecturer at the Lisbon University Institute (ISCTE-IUL), Lisbon, Portugal. He is a researcher at UNIDE and Dinamia (research units of ISCTE-IUL) and UECE (research unit of ISEG-UTL). He has pursued a research agenda in the fields of the economics of technical change and strategic foresight, but has developed a growing interest in the areas of economic history and peace studies. His work has been published in a range of journals including *Research Policy*, *Industrial and Corporate Change*, *Long Range Planning*, *Technology Analysis and Strategic Change*, *Technological Forecasting and Social Change*, *Futures* and *Journal of Economic Issues*. He is a member of the executive board of Obercom (the Portuguese media watch) and member of the executive committee of EconTel (Telecommunications Economics COST Network). In the capacity of expert he has cooperated with the European Science Foundation, the European Commission and the European Committee for Standardization (CEN). He is a consultant on matters of corporate innovation strategy and intellectual property public policy.

Bartolomeo Sapia received his Doctor Laurea Degree in Electronic Engineering *summa cum laude* at the University of Rome 'La Sapienza', and is currently a researcher with Fondazione Ugo Bordoni. He has carried out methodological research in the field of scenario analysis, developing the original methods WISE, SEARCH and GIMMICKS, and applying them to multimedia, broadband networks, the Internet, mobile services and the convergence between fixed and mobile networks. He researched the diffusion of digital television and adoption patterns of interactive services. He has participated in several International projects and is currently chairman of COST (COoperation in the field of Scientific and Technical research) Action 298 "Participation in the Broadband Society".

Notes on contributors

Toni Ahlqvist is a Senior Research Scientist at VTT Technical Research Centre of Finland and a postdoctoral researcher at the Academy of Finland. His research is focused on technology foresight, technological transformation of societies, innovation systems and economic geography. He holds a PhD in human geography from the University of Turku, Finland.

Erik den Hartigh is an assistant professor of Strategy and Innovation at the School of Economics and Administrative Sciences of Özyeğin University (Istanbul, Turkey). He is also affiliated as an assistant professor with the Department of Technology, Strategy and Entrepreneurship of the Delft University of Technology. His research is about corporate strategy, innovation and business networks. He teaches courses in general management, corporate strategy, technology strategy, innovation strategy and innovation systems.

Annele Eerola is Senior Research Scientist, of VTT Knowledge Centre 'Organisations, Networks and Innovation Systems'. Her research focuses on the links between foresight knowledge, corporate strategy and innovation policy. She holds a PhD from Helsinki Swedish School of Economics and Business Administration, and Tech. Lic. degree from Helsinki University of Technology.

Dr Olivier Glassey is a sociologist who studies online mass collaboration and emergent collective behaviours in several domains (virtual communities, social networks, Wikipedia, etc.). He is leading the research unit Social Studies of Science and Technology in the Observation of Science, Policy and Society at the University of Lausanne.

Attila Havas (MA 1983, PhD 1997) is a Senior Research Fellow at the Institute of Economics, Hungarian Academy of Sciences. His academic interests are in economics of innovation, theory and practice of innovation policy, and technology foresight. In 1997–2000 he was Programme Director of TEP, the Hungarian Technology Foresight Programme. He has participated in international research projects on STI policies, innovation and transition, as well as on foresight and prospective analyses, and been a member of several EU expert groups. He has advised national governments and international organisations on the above issues.

Ulrik Jørgensen is a MSc in Electronics Engineering and has a PhD in Innovation Economics. He is professor (docent) of technology assessment at the Department of Management Engineering at the Technical University of Denmark. He is head of

NOTES ON CONTRIBUTORS

the Danish research school for Design and Innovation and leads the strategic research project 'Temporary spaces for user driven innovation'. His research is in the field of science and technology studies with emphasis on design processes, engineering competences, and sustainable transitions.

Sirkku Kivisaari works as Senior Research Scientist in VTT. Her research relates to future-oriented technology assessment and innovation studies. Her special interest lies in enhancing innovations provoked by societal concerns for wellbeing of the ageing society and for cleaner environment. She holds a PhD in business management from Helsinki School of Management.

Raija Koivisto is a Research Professor and team leader in VTT Knowledge Centre 'Organisations, Networks and Innovation Systems'. She has 25 years experience with VTT in safety, security, risk assessment and foresight related research and consultancy. She holds a docent position in the University of Oulu and lectures also in Lappeenranta University of Technology.

Totti Könnölä is Scientific Officer at the Institute for Prospective Technological Studies of the Joint Research Centre in the European Commission. He is also Adjunct Professor of Operations and Technology Management in the IE Business School. His work on innovation and environmental management and policy has been published widely.

Sandro Mendonça is a lecturer at the Department of Economics, ISCTE Lisbon University Institute. His work has been published in a wide range of journals including *Research Policy*, *Industrial and Corporate Change*, *Long Range Planning*, *Technology Analysis and Strategic Change*, *Technological Forecasting and Social Change*, *Futures* and *Journal of Economic Issues*. He is member of the executive board of Obercom (the Portuguese media watch) and member of the executive committee of EconTel (Telecommunications Economics COST Network). He is a consultant on matters of corporate innovation strategy and intellectual property public policy.

Gianluca Misuraca is currently a Scientific Officer at the Institute for Prospective Technological Studies of the European Commission's Joint Research Centre (JRC-IPTS) in Seville, Spain, where he is part of the Information Society Unit focusing on research in the area of ICT for Governance and Policy Modelling. Gianluca is also a Research Associate at the Ecole Polytechnique Fédérale de Lausanne (EPFL) where, before joining IPTS, he was the Managing Director and Scientific Coordinator of the Global Executive Master in e-Governance (eGov), organised by EPFL in collaboration with prestigious institutions worldwide. Previously, he worked for the United Nations Department of Economic and Social Affairs (UNDESA) acting as Liaison Officer for Africa in knowledge management and e-Governance, being responsible for the design and of the e-Africa initiative for good governance and the implementation of the United Nations Online Network in Public Administration and Finance (UNPAN). During his career, Gianluca held several positions as policy advisor for different International Organisations and bilateral cooperation agencies as well as working with various consulting and industrial organisations in the area of e-Government, public administration reform, regional development, research, innovation and technological transfer.

NOTES ON CONTRIBUTORS

Pierre Rossel holds a PhD in anthropology and is currently senior scientific fellow at the College of Management of Technology at the Ecole polytechnique fédérale of Lausanne (EPFL), Switzerland. His main research expertise is the technology assessment and foresight of information and communication technologies, covering a variety of issues and applications from cutting-edge telecom innovation to next generation internet services and digital cities, on which he has published extensively (books, chapters, papers, reports). Within the college of management at EPFL, he gives yearly one-semester courses, at Master level on ‘Early detection of technological innovation potential’, and at PhD level on “Technology foresight”. He has recently initiated a new INTERREG project with the objective of boosting SME innovation capabilities in the French-Swiss Jura Arc micro-technology cluster.

Bartolomeo Sapio received his Doctor Laurea Degree in Electronic Engineering *summa cum laude* at the University of Rome ‘La Sapienza’, and is currently a researcher with Fondazione Ugo Bordoni. He has carried out methodological research in the field of scenario analysis, developing the original methods WISE, SEARCH and GIMMICKS, and applying them to multimedia, broadband networks, the Internet, mobile services and the convergence between fixed and mobile networks. He researched the diffusion of digital television and adoption patterns of interactive services. He has participated in several International projects and is currently Chairman of COST (COoperation in the field of Scientific and Technical research) Action 298 “Participation in the Broadband Society”.

Jan Oliver Schwarz is a strategy consultant at an insurance company, working on strategy and strategic foresight. His research focuses on strategic foresight, scenario planning, trend research, and business wargaming. He holds a MA in General Management, an MPhil in Futures Studies and a PhD on strategic foresight from the Berlin University of the Arts, Germany.

Michael Søgaard Jørgensen is a MSc in Chemical Engineering and has a PhD in Technology Assessment. He is associate professor in user participation in technology assessment and technology development at Department of Management Engineering at Technical University of Denmark. His research areas are environmental management in companies and product chains, sustainable transition strategies and experiences, and technology foresight as part of innovation studies and environmental assessments.

Sébastien Treyer holds a background in environmental engineering, a PhD in environment management, and specialises in foresights for environmental policies. He has been in charge of developing foresights at the French ministry for environment, worked as a researcher at AgroParisTech, and is now director of programmes at Iddri (institute for sustainable development and international relations, Paris), a think tank specialised in policy research and negotiations for environmental issues necessitating coordination at the international scale. He has recently been involved in the “Agrimonde” project, producing scenarios about how to feed the world in 2050 in a sustainable way, and also worked on foresights for environmental policies at the local (national parks) or regional level (water basin authorities).

Patrick A. van der Duin is an assistant professor at Delft University of Technology, section Technology, Strategy and Entrepreneurship. He received his Masters degree

NOTES ON CONTRIBUTORS

in macro-economics at the University of Amsterdam, after which he worked as an applied scientist for six years at KPN Research. He received his PhD at Delft University of Technology. His main focus is on futures research, innovation management and systems, and how futures research and innovation are related to each other. He is also member of the editorial boards of Futures, Foresight, and the International Journal of Innovation and Technology Management.

Contents

<i>Notes on contributors</i>	vii
1. Introduction: new perspectives and practices for managing foresight in changing organisational settings <i>Sandro Mendonça and Bartolomeo Sapiro</i>	1
2. Business wargaming: developing foresight within a strategic simulation <i>Jan Oliver Schwarz</i>	5
3. Weak signals as a flexible framing space for enhanced management and decision-making <i>Pierre Rossel</i>	21
4. Exploring the weak signals of starts-ups as a folksonomic system <i>Olivier Glassey</i>	35
5. Keeping the balance: exploring the link of futures research with innovation and strategy processes <i>Patrick A. van der Duin and Erik den Hartigh</i>	47
6. Changing perspectives on foresight and strategy: from foresight project management to the management of change in collective strategic elaboration processes <i>Sébastien Treyer</i>	67
7. Green technology foresight of high technology: a social shaping of technology approach to the analysis of hopes and hypes <i>Michael Søgaard Jørgensen and Ulrik Jørgensen</i>	77
8. Management of foresight portfolio: analysis of modular foresight projects at contract research organisation <i>Totti Könnölä, Toni Ahlqvist, Annele Eerola, Sirkku Kivisaari and Raija Koivisto</i>	95
9. e-Government 2015: exploring m-government scenarios, between ICT-driven experiments and citizen-centric implications <i>Gianluca C. Misuraca</i>	121
10. Universities and the emerging new players: building futures for higher education <i>Attila Havas</i>	139
<i>Index</i>	159

Introduction: new perspectives and practices for managing foresight in changing organisational settings

Foresight in times of transition and trouble

In times characterised by a tyranny of turbulence foresight arises as a tool for intellectual freedom and enhanced strategic leverage, but, it should be noted, foresight itself is always in a continuing state of experimentation as it is not detached from the changing environment that engulfs organisations. Taking stock from developments in foresight methodologies and implementation experiences is especially important at this moment as the first decade of the present century draws to a close. Looking ahead calls for a review of new perspectives and recent practice on foresight methodology and on how foresight is embedded in organisations.

It might be argued that foresight is needed the most in circumstances in which uncertainty is the most severe and we believe that these are times in which foresight experts and practitioners should rise to the call. The few years into the twentieth-first century have, so far, only heightened a profound sense of immersion into the unthinkable. Citizens, communities and governments have been caught between the shock of dramatic discontinuities and the pressure of powerful long-term trends.

On the one hand, the stability of existing socio-economic structures has been violently pierced by events such as the epoch-defining terrorist attacks on American soil, the onslaught of major natural accidents like the Indian Ocean tsunami and hurricane Katrina, or a financial crisis in Wall Street which morphed into a sharp global economic downturn (variously described as an 'economic Pearl Harbour' and 'once-in-a century credit tsunami' by personalities such as legendary investor Warren Buffett and former US Federal Reserve chairman Alan Greenspan, respectively). On the other hand, the gradual development of trajectories in areas such as climate change, trade globalisation, income inequality, scientific acceleration, technological transition into a networked knowledge economy and the redistribution of geo-political protagonism to emerging powers such as China, Russia and India. Such trends have, slowly but steadily, bitten into the sustainability of old assumptions and perceived options in fields ranging from energy security, through food policy, to peace-building.

The exposure to uncontrollable change taking place — but at different speeds contemporaneously — in a great diversity of dimensions, and met with different levels of surprise

by different actors and stakeholders, creates the potential for alarmist responses that undercut each other at several levels leaving no single agenda contradiction-free. Quick twists and turns in trends invite decision-makers to respond in adaptive, improvised ways, but at the risk of inter-temporal inconsistency. In highly volatile systems moments presenting wholly unique threats and extraordinary opportunities succeed each other at a higher speed than individuals can assimilate, let alone filter and assess them. Constant change may be disarming and demobilising, but it also brings about an excess of half-baked advice. The persistence of turmoil also puts a premium on order; hence, the perpetually renewed proclamation of new 'game-changing' ideas in airport bookshop shelves and the recourse to history as treasure-chest of anecdotes and hints for the future in newspaper columns. Insurance against turbulence, and its traps, is on demand.

In such an environment shaken by incessant, fast-paced change foresight provides a sort of epistemic ballast to organisations. Foresight cushions attention-strapped organisations when in critical times short-run decisions have a critical bearing on long-term performance. Foresight can mediate the everyday interaction of social groups with topics that have a strategic bearing on the future of the economy and the ecosystem, thereby shaping perceptions and practices. In this way foresight can help to integrate heterogeneous and competing agendas, and introduce some degree of dynamic coherence into debates over policy and strategy.

We take foresight to be a deliberate, critical, reflexive and creative forward-looking engagement with future, action-dependent states of affairs. It distinguishes itself from utopia by the consideration of multiple future possibilities and the weight given to possible dystopian outcomes of evolution; it distinguishes itself from fortune-telling by the use of explicit methodologies open to criticism and improvement; it distinguishes itself from forecasting by admitting qualitative techniques and by not giving a misleading appearance of neutrality regarding the qualities (i.e. desirability) of future outcomes. Foresight is about relentless assumption questioning and about the transformation of the parameters that make us understand the future. It is mostly about discovering new options, not so much predicting by extrapolating past routines. Foresight can thus be defined as a research-based activity that draws on a wide array of disciplines and insights in order to build anticipatory and actionable knowledge useful for stakeholders and decision-makers.

Private and public organisations are still a prominent mode of coordinating collective human action in spite of the growth of peer-to-peer, digitally-empowered and mass distributed work in open social and business webs. From this perspective it is of particular interest, both theoretical and practical, to understand the new and evolving ways in which the systematic exploration of the future is being organised. Organisations are situated in dynamic and unpredictable environments, so they have to be innovative and resourceful. The new ways in which foresight is becoming embedded and managed in organisations constitutes the prime focus of this special issue.

A portfolio of foresight perspectives and practices

In today's globalised and technology-rich economy pursuing long-run sustainable routes that are robust enough to withstand short-run disruptions is a restless process that continuously mixes reflection and action. To further this special issue's goals we had the opportunity to assemble an international team of authors coming from a variety of backgrounds. This special issue brings together a sample of real-world experiments and of conceptual proposals designed to bridge between practitioners and researchers in the field of foresight. Such an ambition is an increasingly difficult balancing act as the gap between the needs of organisational leaders and the incentives of

academics becomes an ever widening gulf as a result of increasingly specialised and self-absorbed agendas.

Jan Schwartz presents 'business wargaming', a simulation technique that can be implemented to make several teams within a given company more aware of their own interacting dynamics, of their competitors and the market. Lessons learned in this safe environment are of value to different organisational stakeholders, including top managers, workers and mid-level team leaders, who have to become more and more multifunctional to deal with complex business missions in which tolerance for error is declining. In his pioneering contribution Schwartz articulates how 'business wargaming' can become a tool in the arsenal of strategic foresight.

Pierre Rossel's paper refers to the role of weak signal analysis as a broad canvas in which organisational stakeholders can appraise and re-appraise strategising hypotheses in rugged decision-making environments. Rossel deals with the issues of examination of potential seeds of future change by directly confronting the question that pattern-recognition and pattern-projection may be indistinguishable in real time, that is, that observing reality and constructing it overlap. To capitalise on the paradox Rossel tackles a number of metaphors in the literature and advances the debate by introducing the twin notions of flexible framing and meta-framing as a conceptual matrix in which pattern identification efforts can take place in analytically reflexive conditions.

Sébastien Treyer's reflection starts out by a clear and simple, but often dismissed, premise; that foresight projects are typically initiated in already existing strategic conversations. Foresight projects are no mere one-off operations; they are exercises that play at the same time with old and new elements. An implication is that the effectiveness of foresight capabilities within organisations is partly a function of the success in both re-parameterising the representations of the future while keeping a link to past references that allow a community of participants to accumulate insights and knowledge. This conceptual framework allows us to stretch current best practice in foresight by providing a ground on which to erect criteria for quality evaluation of foresight interventions, to use the author's apt terminology.

The paper by Patrick van der Duin and Eric den Hartigh examines the tension between the technological innovation process and the strategic formulation process. Their argument is that foresight serves as a weight/counter-weight system between processes that are designed to open up options (innovation) and close down alternatives (strategy). The authors articulate their view on how foresight research interplays with innovation management and strategy making on the basis of a survey of multi-national companies. In their words, foresight as an integrative tool in the 'battle for the future' has different uses in different theatres of operations. A framework that combines stability vs dynamism of the internal and external environment of business firms is used to qualify the role of foresight in a setting of four ideal-type situations.

Michael Sørgaard Jørgensen and Ulrik Jørgensen tell the story of a 'green' foresight project initiated by a Danish public organisation. In doing so their paper sheds light into how prospective environmental opportunities and threats can be managed in a way that takes into account the necessary contestability of possible social and technical solutions that may emerge as priorities. The discursive approach that Jørgensen and Jørgensen describe constitutes a model of how the complex relationship between social visions and technological options may be at the same time problematised and, simultaneously, held out as an opener of innovative policy pathways that were not predicted by stakeholders.

Gianluca Misuraca's paper charts the course from the reality of e-Government of first generation ('e-Gov 1.0') to the rhetoric of 'e-Gov 2.0'. On this dynamic background the author discusses the future promises of m-Government. The paper further addresses the various emerging scenarios

and how they can be used in a policy relevant way, suggesting that m-Government appears to be a promising area for research and experimentation, opening new possibilities for delocalised governmental servicing and user involvement.

The team of authors headed by Totti Könnölä offers an analysis of what may be termed 'modular' foresight projects at a leading contract research organisation, the VTT, Technical Research Centre of Finland. What marks the VTT case out is the huge variety of foresight projects managed and the variegated range of foresight expertise involved. This team of authors offers an account of how it is possible to make sense of a widening array of exercises by developing a framework for the integrated management of the different kinds of foresight activities. Modular process design arises as a sensible option to minimise the cost of running such activities while taking advantage of the cross-fertilisation potential of available expertise.

Attila Havas focuses on a long-established institution, the University, and discusses how novel methods are needed to shape the future of the higher education system. Havas suggests multi-level 'cascading' futures framework as key trends and driving forces are international in their nature and universities are embedded in broader stakeholder systems. What is proposed is multi-level foresight as a way to appraise desired and feasible future states and, more broadly, as a source of higher education renewal.

This special issue grew out of the final conference of COST A22 network entitled 'From Oracles to Dialogue: Exploring New Ways to Explore the Future', held at the National Technical University, Athens, Greece, 9–11 July 2007.

Acknowledgements

A number of researchers and practitioners contributed to the collective effort of reviewing the papers. We greatly appreciate the contribution of Alexandre Abreu, Anders Koed Madsen, Andrea Pannone, Andreas Graefe, António Ioris, Barend van der Meulen, Christof Weinhardt, Cristiano Cagnin, Eugene Loos, Jan Schwartz, Jon Mikel Zabala Iturriagoitia, Jonathan Snapsed, Jorge Vieira, José Luís de Almeida e Silva, Magnus Gulbrandsen, Miguel Lopes, Miguel Pina e Cunha, Olivier da Costa, Patrícia Palma, Patrick Law, Pedro Puga, Peter Hall, Pierre Rossel, Roberto Poli, Serge Stalpers, Simone Arnaldi, Tiago Mata, Tomaz Turk and Totti Könnölä. This special issue also owes to the encouragement and editorial support of Harry Rothman and Sean Rothman.

Business wargaming: developing foresight within a strategic simulation

Jan Oliver Schwarz

Berlin University of the Arts, Germany

The development of foresight is a crucial activity for any organisation, especially in times of increasing dynamism and complexity. The aim of this article is to discuss the usefulness of developing foresight in a business wargame. Wargaming, a role-playing simulation of a dynamic situation, has been used mainly by the military, but more recently, it has also been used in the context of competitive intelligence and strategy-testing in organisations. A business wargame typically evolves several years into the future, allowing the participants to 'experience' future dynamics in the organisational environment and, consequently, to develop foresight. This article argues that, because of its participative and dynamic nature, business wargaming can overcome cognitive barriers, challenge mental models, detect weak signals of change in an organisational environment, re-direct attention in an organisation, and assist an organisation in developing foresight.

1. Introduction

Organisations are confronted with a more complex and dynamic environment than ever, one that is characterised by discontinuities and an uncertain future. This condition is likely not only to continue but to intensify. The major tasks for today's managers are to make decisions, formulate strategies, and implement strategic management systems; however, in such an environment, the imperative of 'predict and prepare', the foundation of the neoclassical school of management (Gharajedaghi 1999), is no longer appropriate. Corporations are now being urged to develop foresight (Hamel and Prahalad 1994; Courtney 2001), to prepare for the future, not just to predict it. In addition, several governments have already engaged in national foresight activities, a trend that is also likely to accelerate (Martin and Johnson 1999).

In practise, the dominant question for organisations remains, how to develop and implement foresight processes. While the scenario technique has been praised as valuable in developing foresight, numerous barriers, especially cognitive ones, exist (De Geus 1997; Bazerman and Watkins 2004; Day and Schoemaker 2004; MacKay and McKiernan 2004; Seidl and Van Aaken 2004); these cognitive barriers tend to hinder foresight (Schwarz 2005).

The primary aim of this article is to examine how business wargaming could contribute to developing foresight and to reducing the organisational barriers to developing foresight. Business wargaming has been applied for several centuries to the military field and since the late 1980s management has used it for instance to test strategies. In short, a business wargame is a role-playing simulation of a dynamic business situation (Kurtz 2003).

The article is organised as follows: first, the role and the importance of developing foresight will be discussed; second, the scenario technique will be critiqued and the cognitive barriers to developing foresight will be discussed; third, the method of business wargaming will be introduced; and fourth, the advantages of business wargaming and its role in the foresight process will be explored.

2. Developing foresight

As early as 1931, Alfred North Whitehead, in a celebrated lecture at the Harvard Business School, identified foresight as the crucial feature of the competent business mind (Tsoukas 2004). Since the late 1980s, foresight has been used to describe activities that inform decision-makers, by providing input concerning the long-term future (Miles, Keenan, and Kaivo-Oja 2003). However, the term is often used interchangeably with terms such as futures studies and prospective analysis, so there is little consensus on the boundaries between these fields.

Makridakis (2004, XIII) states that the role of foresight is 'to provide business executives and government policy makers with ways of seeing the future with different eyes and fully understanding the possible implications of alternative technological/societal paths'. Foresight involves spotting developments before they become trends, seeing patterns before they fully emerge, and grasping the relevant features of social currents that are likely to have an impact (Tsoukas 2004), rather than making predictions. Ideally, foresight recognises even faint signals of change or trends in the corporate business environment and imagines alternative pictures and how organisations will evolve as a part of these pictures.

As a process in an organisational context, foresight is based on the principle that discontinuities (in most cases) do not emerge without warning, and these warning signs can be described as 'weak signals' (Ansoff 1975). Foresight aims at early detection of these signals, which could lead to strategic surprises and to an event with the potential to jeopardise the organisation's strategy. Day and Schoemaker (2006, 1–2) articulate the purpose of spotting weak signals as providing the opportunity to 'quickly spot those signals that are relevant and explore them further, filter out the noise, and pursue opportunities ahead of the competition or recognise the early signs of trouble before they escalate into major problems'. The role of a foresight process in an organisation is not so much to predict the future, but to prepare for it (Tsoukas and Shepherd 2004).

Chia (2004) argues that foresight is achieved in an organisation by re-educating management. There are several ways for an organisation to generate foresight. The scenario technique (Fahey and Randall 1998) or Delphi iterations (Helmer 1983) can be applied to develop foresight, but a full foresight process, which incorporates these tools and other processes, is more promising. The argument has been made that a foresight process (Horton 1999) involves three phases, this has in particular been recognised in the German discussion on foresight processes, referred to as *Strategische Frühaufklärung* (Müller 1981; Krystek and Müller-Stewens 1993; Liebl 1996, 2000):

- (1) Information gathering, achieved by scanning the organisational environment (Aguilar 1967) for weak signals, which can also be perceived as trends.

- (2) Diagnosing and interpreting the detected trends.
- (3) Formulating reaction strategies in response to those trends.

3. Scenario criticisms and cognitive barriers

Scenarios or scenario planning are crucial to developing foresight, but scenario planning has been the subject of criticism. Understanding this criticism, in addition to the cognitive barriers to the development of foresight, will add texture to the discussion on business wargaming.

3.1. Scenario planning and its criticism

Scenario planning has its roots in the scenario technique, which was developed at the Rand Corporation in the 1950s (Pohl 1996). In the 1970s, it was elaborated and refined by Royal Dutch/Shell, which integrated the scenario technique with strategic planning (Fahey and Randall 1998). The aim of scenarios is to feature trends, alternatives, key uncertainties, and to combine them into pictures of the future, not covering all eventualities but defining the substance and the boundaries of future outcomes (Schoemaker 1992). In addition to the important task of providing alternative pictures of the future, scenarios and scenario planning can restore complexity to the strategic planning process and challenge the mental models of the managers involved.

However, scenario planning is vulnerable to the charge that scenarios struggle with incorporating future dynamics of markets. Orišek and Friedrich (2003) pointed out that the scenarios used in scenario planning processes are often little more than projections crafted onto past experiences. They criticise scenario planning and the standard planning process for relating less to the future than to the past and, therefore, allowing the organisation to be ambushed by unforeseen events. MacKay and McKiernan's (2004) criticism claims that scenarios often fail to spot the weak signals of change in an organisational environment, an argument which also has been reiterated by others (Liebl 2004; MacKay and McKiernan 2004; Neugarten 2006; Postma and Liebl 2005). These authors contended that the knowledge basis of a scenario exercise is often unclear, which suggests that mental models have not been sufficiently challenged. Kurtz (2003) comments that criticism of both planning and scenario planning concepts have evolved from the failure to enlist the participation of enough management staff in a learning exercise to confront, understand and deal with the dynamics of particular business situations. Schwarz (2006, 2008) complains that scenario exercises tend to be time-consuming and complicated. These criticisms of scenario planning reveal some room for improvement for approaches to the development of foresight in an organisation. However, the manner in which a scenario exercise is carried out is just as critical.

3.2. Cognitive barriers to foresight

In addition to numerous operational reasons (Schwarz 2005), which hinder foresight, several authors have blamed cognitive barriers for the failure to develop foresight (De Geus 1997; Bazerman and Watkins 2004; Day and Schoemaker 2004; MacKay and McKiernan 2004; Seidl and Van Aaken 2004). Organisations often fail to perceive weak signals of change or trends because they do not fit the mental models of the organisation and are therefore rejected. Senge (1990, 8) defines mental models as 'deeply ingrained assumptions, generalisations, or even pictures or images that influence how we understand the world and how we take action'.

Day and Schoemaker (2006, 37) for instance describe obstacles to developing foresight as the 'powerful tendency to ignore warning signals and pretend that all is well. The more intelligent

<p>Mental filters: Research shows that people tend to force the world into their existing frames. Weak signals that don't fit are typically distorted or ignored. Humans see what they expect to see, rather than what is there.</p>
<p>Overconfidence: A demonstrated tendency to be too certain also makes people tend to believe that the current view they hold is correct.</p>
<p>Penchant for confirming as opposed to disconfirming evidence: It is more difficult to detect disconfirming evidence than confirming evidence, so the mind is more likely to accept than to reject an idea.</p>
<p>Dislike for ambiguity: People dislike ambiguity, particularly in organizations in which managers are expected to have answers to questions.</p>
<p>Groupthink: Members of organizations take comfort from belonging to the majority and seeing the world in the same way, so there is a tendency to go along with what others say, rather than to use an individual mind to find flaw in the group's thinking.</p>

Figure 1. Cognitive barriers (Day and Schoemaker 2004, 138).

we are, the better we also are at rationalising away important signals of impending doom.’ The relevance of cognitive barriers in foresight is also underscored by the notion that cognitive activities are based on concepts of the future (Ingvar 1985) and that humans can only imagine the future in ways which are related to their experience and understanding of the past (Reading 2004).

Understanding how cognitive factors can interfere with the process is an important part of implementing a foresight process in an organisation. As depicted in Figure 1, these factors include mental filters. Ilmola and Kuusi (2006) have linked the hindering of foresight to filters of weak signals such as overconfidence, a penchant for confirming, rather than disconfirming evidence, dislike for ambiguity and groupthink.

4. Introducing business wargaming

The following sections describe the method of business wargaming and how business wargaming can be a vehicle for developing foresight; it also responds to criticism of scenario planning and cognitive barriers to foresight.

Kurtz (2003) describes a business wargame as a role-playing simulation of a dynamic business situation. Each team in the wargame is assigned to play a stakeholder, such as a competitor. The typical business wargame lasts several rounds, each one representing a predetermined time period. A business wargame is usually prefaced by extensive research on the industry in which the wargame is supposed to take place.

‘Wargame’ is the literal translation of the German *Kriegsspiel*. Since, because of the gravity of war, many people in the military are uncomfortable with the term *game*, wargames have been called ‘map manoeuvres’, ‘field manoeuvres’, ‘exercises’, or more recently, ‘modelling and simulation’. The business world has its own reservations with the use of the terms ‘war’ and ‘game’, so wargames have also been referred to as ‘strategic simulations’ (Oriesek and Schwarz 2008).

Wargames can have several purposes, among which are strategy-testing, crisis planning and management, change management, planning, and training and education. Wargames have been applied in both the public and private sectors.

4.1. *History of business wargaming – military*

Business wargaming can be traced as far back as ancient Greece. It grew out of military wargaming, which was used to prepare generals and officers for unforeseen circumstances on the battlefield. Games about warfare have probably existed as long as warfare itself (Perla 1990). Perla (1990) credits the Chinese general and military philosopher Sun Tzu for inventing the first wargame, 'Wei-Hai', meaning 'encirclement', about 5000 years ago. 'Go', appeared around 2200 BCE, 'Chaturanga' around AD 500, and chess probably in the sixth century. All could be perceived as the successors of this wargame. Even though chess is much more abstract than other wargames, chess and its forerunners contain elements of warfare.

The proliferation of military wargaming increased in the nineteenth century when armies expanded, making them more difficult to move and industrialisation brought in artillery that was capable of reaching farther with faster repetition and greater precision. By the end of the nineteenth century, automatic machine guns had been introduced, increasing individual firepower, and the railroad made it possible to move troops faster. Wargames were used in Prussia, the USA, United Kingdom, Italy, France, Russia and Japan, especially after the Prussian victory in the Franco-Prussian war of 1870–1871. The USA, which continued to use wargaming after the Second World War, is regarded as the pacesetter in twentieth-century military wargaming. By the end of the twentieth century, the US military was using wargaming to enable its military strategies to impose some certainty on an uncertain future (Haffa and Patton 1999).

4.2. *History of business wargaming – management*

In 1957, the American Management Association (AMA) developed the first widely known business game, 'The AMA Top Management Decision Simulation' (Kalman and Rhenman 1975). The AMA game required five teams of three to five players each to make business decisions. The simulated company produced a single product, which was sold in an open and competitive market and the players represented company officers. Five to ten years of company operation were usually simulated in each game. In order to reduce the participants' computational burden, the AMA game allowed each company only a few decision alternatives and a mathematical model, aided by computers, was used to evaluate the teams' performance.

In 1958, the *Harvard Business Review* (Andlinger 1958) published an article on the application of wargaming to the business environment; the article referred to 'business gaming' and 'management simulation'. The games described in the article were primarily used for training and education and built on the military use of wargaming. These business games can be classified as general games, where top management makes the decisions that need to be made, or functional games, which concentrate on a company's functions, such as production, finance, or marketing.

Even though business wargaming had been applied to company planning in the 1950s (Bellman et al. 1957), wargaming was not widely and strategically adapted for business purposes until the mid 1980s (Ginter and Rucks 1984; Treat, Thibault, and Asin 1996). In the field of competitive intelligence, business wargames have drawn special attention for their focus on the competitors. More recently, business wargaming has emerged as a tool for competitive intelligence and for strategy formulation (Kurtz 2003).

4.3. *How does a business wargame work?*

A business wargame (Orišek and Schwarz 2008) typically evolves over three moves and represents a certain length of time (e.g. 3–10 years). Four types of teams usually compete in