

---

## **Pitfalls in and success factors of corporate foresight projects**

---

**M. Atilla Öner\***

Department of Business Administration,  
Yeditepe University,  
IIBF 413, 34755 Kayışdağı,  
Kadıköy, Istanbul, Turkey  
E-mail: maoner@yeditepe.edu.tr  
\*Corresponding author

**Senem Göl**

Department of Business Administration,  
Yeditepe University,  
IIBF 500, 34755 Kayışdağı,  
Kadıköy, Istanbul, Turkey  
E-mail: senemgol@yeditepe.edu.tr

**Abstract:** The main purpose is to propose a new and integrated framework for the pitfalls in and success factors of corporate foresight projects in order to facilitate better conversion of their results into actual changes in corporations. The main approach is theoretical development of corporate foresight success factors and project management followed by a conceptual framework. The paper proposes to increase the 5 Cs of successful foresight projects to 12 Cs by incorporating *content, competence, change, continuity, courage, curiosity and connectedness*. We also link them with possible pitfalls likely to be fallen into different phases and stages of corporate foresight projects. The paper is limited to a conceptual model. Further research should include analysing the level of the reported success of foresight project results of companies based on our assessment model. It is hoped that the proposed framework will support the reliability of the foresight studies and bring a new methodological challenge.

**Keywords:** foresight; success factors; pitfalls; project.

**Reference** to this paper should be made as follows: Öner, M.A. and Göl, S. (2007) 'Pitfalls in and success factors of corporate foresight projects', *Int. J. Foresight and Innovation Policy*, Vol. 3, No. 4, pp.447–471.

**Biographical notes:** M. A. Öner is currently an Assistant Professor at the Department of Business Administration at Yeditepe University, Istanbul, Turkey. He is the Chairman of the Board of Directors and the CEO of Management Application and Research Center at Yeditepe University. His research interests are foresight methodology, technology roadmapping, R&D management and technology management. He supervises MS/MBA and PhD theses on national innovation systems, pilot national (sectoral) foresight studies and system dynamic modelling of R&D management, project management and public policy issues.

S. Göl is a PhD student and lecturer at the Department of Business Administration at Yeditepe University, Istanbul, Turkey. She is also the Programme Directing Manager of Management Application and Research Center at Yeditepe University. She received her Bachelor of Arts in Business Administration from Marmara University, Istanbul in 1997 and her Master of Business Administration from Nebraska University, Lincoln, USA, in December 1998. In the summer of 2005, she had a short-term internship at United Nations Industrial Development Organization (UNIDO) and worked for the Industry Promotion and Technology Department on *Foresight Issues*. Her current research focuses on foresight, project management and gender issues.

---

## 1 Introduction

Corporate foresight creates a vision to look beyond the close environment of organisations. One of the main challenges of the organisations is to formulate clear perspectives and attach them into their daily decisions and actions. Radical political and economical changes, the increased global competition, the triumphant improvements in transformation and communication, as well as, scientific breakthroughs of everything within the field of the social sciences form the basis for the need of a differentiated organisational formation. The necessity for foresighted managerial policies helped the transfer of future research tools and methodologies into corporate application. The search for comprehensive – and creative – solutions and innovation provided the need for corporate foresight (Table 1).

Corporate foresight is build upon the rationale that it is the end-result of companies' operations which demand long-term orientation or it is taken as an anticipatory action to better cope with the complexities and the uncertainties of the business environment in general (UNIDO, 2005). There is a vast use of corporate foresight in strategy development, as well as in innovation development, marketing and in R&D. However, a number of common problems of its use and integration create pitfalls on the conversion of foresight project results into actual change in corporations. Our study plans to look at those factors in order to provide a contribution both to the receiving end and to the decision-making process of foresight studies. This can either help to support the reliability of the foresight studies as they have been implemented or may bring a new methodological challenge.

In this study, we emphasise approaching corporate foresight as a project in order to address the level of the reported success of the conversion of foresight project results into actual changes in corporations. The most important aspects of foresight projects are identified in the literature as 5 Cs. In our study, we take a lead in proposing to increase those defined components of successful corporate foresight into 12 Cs by incorporating *content, competence, change, continuity, courage, curiosity* and *connectedness*. More effective foresight project results would be possible, if the detailed pitfalls of each project stage were identified and considered in a more systemic and integrated way. We aim to offer a framework for considering those pitfalls based on the work of Andersen et al. (1996) and the present study. We also aim to associate those defined 12 success factors with the pitfalls defined in each of the foresight project stages in a further attempt to explain the *level of reported success of conversion of foresight project results into actual changes in corporations*.

**Table 1** From Classical Future Research to Corporate Foresight

<i>Years</i>		<i>Social context</i>	<i>Context</i>
1940–1950s	Future research ‘is invented’	<p>It is an answer to</p> <ol style="list-style-type: none"> <li>1 the attained level of development of science and technology,</li> <li>2 requirements of modern warfare and</li> <li>3 the increasing complexity of human planning and control over nature.</li> </ol> <p>Think tanks, planning models and operation research shape the future research.</p> <p>Client is the state/government.</p>	<p>After World War II, companies experienced a long phase of economic prosperity. Upswing, prosperity and consumption are the founding fathers of the western business models.</p>
1960s	Future research as instrument/tool of the feasibility ideology	<p>The dream of – always – protecting the technical progress and the race of the systems determines the agenda and shapes the thoughts of the participants. The scenario technology and the Delphi method enter into the arena; it is the unity of the experts.</p>	<p>Business-as-usual faces the first economic limits. Automation and rationalisation widely spread.</p>
1970s	Future research differentiates itself	<p>The future researcher scene changes the economic and ecological crisis experiences, the social movements and the borders of the prognosis. The belief in the measurability fades. The world is taken as an interconnected system (Club of Rome). New actors, future workshops develop; world models and scenario studies determine the field; it is the beginning of the first international future research.</p>	<p>Industrial solutions induce social reactions. Companies discover their environment. Pioneers like shell use scenario-thinking.</p>

**Table 1** From Classical Future Research to Corporate Foresight (continued)

<i>Years</i>		<i>Social context</i>	<i>Context</i>
1980s	Future research internationalises itself	Ecological, technical and global risks sensitise the public. The global interdependencies penetrate into the foreground of the future research. The connection of environment and sustainable development and the interests of future generations move into the field of vision. Institutionalising and internationalisation in extended future researcher scenery.	Deforestation, Chernobyl and global warming shape the consciousness of consumers and their purchase behaviour; state interventions and a highly sensitive public change communication with enterprises and their reactions fundamentally.
1990s	From future research to corporate foresight	Radical political changes, the triumphant advance of the economic globalisation and internet, as well as scientific breakthroughs in biological and genetic sciences form the basis for differentiated organisational formation. Future research refines its tools. Conversion and transfer questions enter into the foreground; businesses arise strengthened as client.	Liberalisation of markets. Businesses are driven by social and technical discontinuities. Businesses improve their negotiation skills. Corporate foresight develops increasingly towards an independent task area.
2000s	Corporate foresight is established	The global trade pressures, the interconnected problem structures and search for comprehensive and creative solutions and innovation provide the need for a future research.	Businesses recognise the necessity for a foresighted managerial policy and its restrictions. Corporate foresight refines processes and methods.

*Source:* Translated and adapted from Burmeister et al., 2005

## **2 Success factors of corporate foresight**

The success of foresight depends on the match between its context (level of development, and hence the goal of the programme) and the methodology applied (UNIDO, 2003). Irvine and Martin (1984) along with the label '*foresight*' introduced the most important aspects of foresight as the '5 Cs'.

- 1 *Communication*: bringing together disparate groups of people and providing a structure within which they can communicate.
- 2 *Concentration on the longer term*: forcing individuals to concentrate seriously and systematically on the longer term.
- 3 *Coordination*: enabling different groups to coordinate their future R&D activities.
- 4 *Consensus*: creating a measure of consensus on future directions and research priorities.
- 5 *Commitment*: generating a sense of commitment to the results among those who will be responsible for translating them into research advances, technological developments and innovations for the benefit of society.

After the formulation of the original '5 Cs' of foresight, 'comprehension' was included in the formulation by other scholars.

- 6 *Comprehension*: to encourage those involved to understand the changes happening in their business, or professions, at a global level, and to exert some control over these events.

The critical factors for the success – and thereby for its impact – of any corporate foresight activity are also defined as the outcomes that are highly relevant to present strategic questions and of high quality, and high degree of participation and involvement, an adequate and inspiring communication within and about the process and its results, as well as a 'foresight culture' and commitment to the process (Daheim and Uerz, 2006).

In order to describe the factors affecting the success of corporate foresight activities, it is crucial to understand the *pitfalls* of foresight projects. Foresight exercises include a number of elements such as a *structure* to anticipate and project long-term social, economic and technological developments and needs; interactive, participatory *methods* of debate and analysis with various stakeholders and *outputs* that range from new social networks to guiding strategic visions with a shared sense of commitment.

The most important and characteristic aspects of project works were defined as the extent to which *people* are involved in the project, and who will use the results, and of those who are invited to *participate* in the work (Alsan and Öner, 2003). They highlight the importance of participation, which is necessary to maintain in the medium term or on the strategic level, and could not be neglected after a short period of time the decision to act is taken.

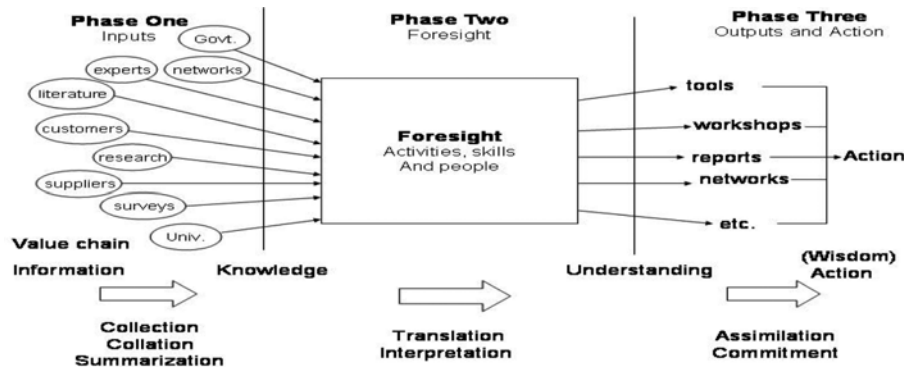
A systemic perspective was also proposed to be adopted from the very beginning of the foresight studies for the successful implementation of its outcomes at the very end of the exercise (Öner and Sarıtaş, 2004). In our study, the above-proposed systemic perspective is supported through the *connectedness* factor described for the success of the foresight project activities. It was also emphasised that the insufficient attention given to

the pre-foresight or post-foresight phase is the reason why many foresight efforts failed indicating the importance of the design phase (Martin and Irvine, 1989).

A relevant definition of foresight process in Figure 1 also features three phases of the foresight process, which include inputs, foresight and outputs and action:

- 1 Phase one comprises the collection, collation and summarisation of available information (usually that such as trends, expected developments, brainstorming unusual happenings and so on) and results in the production of foresight knowledge.
- 2 Phase two comprises the translation and interpretation of this knowledge to produce and understanding of its implications for the future from the specific point of view of a particular organisation.
- 3 Phase three comprises the assimilation and evaluation of this understanding to produce a commitment to action in a particular organisation.

**Figure 1** A successful foresight process and the value chain (Horton, 1999)



The knowledge accumulated and summarised in *Phase one* needs to be translated into a language that is understood by the organisation. Therefore, *Phase two* is critical to the foresight process since there an understanding of what can (or cannot) be done for the future is generated. The *last phase* of actions is the place at which the value of all the foregoing work can be instrumented. It is also highlighted that the importance of foresight process done within the organisation not just for ownership of the outcome but also, the assimilation and commitment to action (Horton, 1999). However, he suggested that “it is usually impractical for everyone in an organisation to be involved in the foresight process and much of the outcome will still need to be communicated to a wider audience”. Thus, along with innovation and training, long-term tracking of the organisation through this process may be the only practicable route in measuring the foresight effectiveness.

The real value of foresight is also realised at the very end of the process whilst the highest level in information value chain – *understanding* is reached. However, this requires a significant time lag in this process and each phase is more difficult and time consuming, more abstract and less easy to measure than the preceding one (Horton, 1999). Thus, the key point which Horton (1999) highlights is that organisations which carry out the above foresight process together with third parties will only be successful if

they can assimilate the results to the recipients with a good understanding of their needs, aspirations and language.

Several obstacles to the implementation of foresight outcomes were also acknowledged, reflecting foresight's complex and conflicting characteristics (Gilbert, 1976; Bryson et al., 1987; Glenn and Gordon, 2001). Structural and behavioural aspects of foresight studies are the obstacles mentioned above. The obstacles reflecting structural problems are those strategic, political and informational factors that are mainly related with the management of part-whole relations and internal and external environments. In order to prevent conflict among participants and stakeholders while helping the dissemination of the decisions with a broad participation in foresight activities, Öner and Sarıtaş (2004) suggested the use of the Integrated Management Model (IMM). The application of IMM will not only employ a multiple perspective approach between management components but also the integration between foresight and its implementation through strategic planning.

On the other hand, the importance of people and behavioural issues were emphasised in order to increase foresight project results' application on the social level (Slaughter, 1996). Therefore, prior to constructing a model, it is crucial to realise the factors that affect the success of corporate foresight project results. As indicated, it is people and structures that make the difference (Godet, 1994).

Another important factor affecting the success of foresight project results may lie in *optimism/pessimism* from beliefs about future. Optimists tend in most situations to emphasise their hopes, while pessimists are dominated by their fears. Wenglert and Rosen (2004) defined optimism-pessimism in terms of an expectancy-value model based on subjective probabilities and subjective values for positive or negative future events in one's personal life and for positive or negative future general world events (Wenglert and Svenson, 1982). According to the same article, optimism-pessimism about one's personal future was weakly associated with that for the general world. The same question of attitudes arising towards futures within the two polar opposites of optimism and pessimism has also been emphasised (Slaughter, 1993): "*An optimist person may believe that there is no cause for alarm, when in fact there may be very good cause for it. Similarly, a pessimist person may get so concerned about a particular problem that they will get up and do something about it.*"

### 3 Pitfalls and problems of corporate foresight projects

Corporate foresight methods and activities are becoming crucial for innovation processes and apt to look beyond close environments, but a number of problems of their use and integration need to be proliferated. Although corporate foresight activities have become more important and widespread by many companies, there are factors impacting the successful conversion of foresight project results into actual change in corporations, which needs to be improved by defining the pitfalls and challenges of corporate foresight.

In order to get a first overview of the current uses, practices and impacts of corporate foresight in private sector in Europe, Becker (2002) interviewed 19 companies. Out of 19 companies only Procter and Gamble and Lufthansa used foresight activities to provide only input for an individual project or a specific decision. DB, Volvo, Eni, Siemens and IBM focused their foresight efforts on the meso-level where they provide input for the strategic decision-making process in entire subject areas of research. Those activities

were said to be specialised and centred on specific issues in R&D such as the long-term planning of research programmes in certain technological areas or business units.

Companies such as Aventis, BASF, British Telecom were defined as using foresight information as a basic input for both the decision-making process in different business areas and for the corporate strategy development (Becker, 2002). Those companies used analyses to monitor not only of special fields of technology but also more general trends in the social, economical, political and regional area since they operate in sectors that are strongly globalised.

Companies such as Philips, DaimlerChrysler, Decathlon, Ericsson and EdF were engaged in rather holistic foresight activities where foresight is used to serve as means to develop more comprehensive visions of the future and analyses are undertaken to better understand the structural changes in science and society.

Having analysed the organisational characteristics of the foresight process in European companies, problems of current foresight practices were listed by Becker (2002) as being methodological, organisational and managerial and integration.

### *3.1 Methodological problems*

One of the problems where foresight needs a better/stronger methodological grounding, especially with regard to quantitative analyses and economic modelling, in order to achieve a greater accurateness of its results.

Although qualitative methods were gaining ground, the acceptance of qualitative foresight knowledge was reported to be problematic in upper management (Neef and Daheim, 2005).

### *3.2 Organisational and managerial problems*

Another kind of problem where

- 1 foresight results to be better delivered and better disseminated to the relevant target groups and to create a higher commitment for a successful end-results
- 2 foresight needs to generate relevant information and end up in concrete results and real products
- 3 foresight studies need more feedback from the users of foresight data in order to trigger off learning effects and to make foresight predictions more accurate and more 'user-friendly/customer' oriented
- 4 a need for the development of ways to better measure the benefits of foresight activities on the business success
- 5 too much 'uncertified' knowledge in the field prevents from separating good experts from the bad ones.

### *3.3 Overall integration of foresight activities in the company*

Under this third category, corporate foresight is coping with 'low level of diffusion (extent of practical use in businesses, in general) versus sophisticated state-of-the-art "lead user" development, as well as the gap between "report culture" and "need for action"'.



- 1 Corporate foresight often is too fragmented (no centralised offices/departments) and too segmented (too specialised and too uncoordinated).
- 2 Foresight activities need to be re-positioned in the company such as the use for corporate development and strategic planning rather than only R&D decision-making issues.
- 3 Foresight activities need to be more integrated with the corporate culture.
- 4 Much emphasis needs to be put on long-term thinking rather than the current 'shareholder value'.
- 5 No effort to integrate micro-, meso- and macro-level aspects in foresight exercises.
- 6 Lack of networks – both internal and external – of foresight professionals which
  - withholds the companies to benefit from the use of more know-how.
  - creates double work and not-enough efficient re-use of previous work.

Typical problems and pitfalls of corporate foresight are also defined under three main topics as follows (Neef and Daheim, 2005):

- 1 Playground pitfall: *No building of knowledge pool* – a lack of continuity of activities, lack of commitment to corporate foresight
- 2 Monologue pitfall: *Results remain more or less unknown internally* – low level of diffusion of results into the corporation
- 3 Lone rider pitfall: *Acceptance and implementation problems for outcomes* – lack of integration of colleagues/employees into the process.

A study by Müller (2006) on 152 large European countries also drew the attention to the challenges of corporate foresight where the key problems were listed as being *organisational and political barriers, insufficient legitimation and perceived high costs*. The reasons for the persisting problems of corporate foresight were assumed to be due to the *lack of clarity about the objectives and performance*.

The above statements as challenges in implementing foresight projects are vital since they affect the outcomes of any type of foresight exercise; policy outcomes for national science and technology, or social programmes or actual outcomes for companies in the form of products, processes, trends and R&D to facilitate their core competence in business.

#### **4 Corporate foresight as a project**

In our study, we suggest in approaching to the pitfalls of corporate foresight along with our *redefined and enhanced* preconditions for the success or failure of a project, described by Andersen et al. (1996), embedded with the defined processes/phases. More effective foresight project results would be possible if the detailed pitfalls of each project stage were identified and considered in a more systemic and integrated way. We aim to offer a new framework for considering those pitfalls.

#### 4.1 Pitfalls in the foundations of the corporate foresight project

This is the ‘pre-foresight’ (Irvine and Martin, 1984) phase where the corporate foresight project executers’ attitude and the preliminary work are provided. It is the phase where the purpose is defined and needs are identified (Stewart, 2001). The recognised need for a corporate foresight will gain power in this phase and if there are cracks in the foundation, the total corporate foresight project will suffer from its results. *Insufficient support for the project* and *poor corporate foresight project definition* are of the two main possible flaws in the foundations.

- 1 *Insufficient support for the project* – The corporate foresight needs to fit into the overall corporate plans (i.e. vision, mission). The corporate foresight project activities must be supported by the top management (Englund and Graham, 1999) and must be given adequate priority. A corporate foresight project independent of the overall corporate plans is likely to fail from the beginning.

In 72.5% of all European companies practicing strategic foresight, these activities are promoted by top management, with 75% of all companies considering foresight to be an executive responsibility and top management in 60% of all companies regularly participating in foresight projects (Müller, 2006; cited in Daheim and Uerz, 2006). Therefore, top management support in corporate foresight is regarded as one of the crucial success factors in embedding those activities to the corporate culture since continuity and the impact of corporate foresight are much higher when a foresight process involves top management involvement.

- 2 *Poor corporate foresight project definition* – corporate foresight projects not precisely defined may be due to the unclear goals of the corporate foresight project, lack of the limits of the scope of the corporate foresight project and imbalance between the new technology to be introduced and the levels of ambition for changes to people, systems and corporation overall.

The goals of the corporate foresight project need to define the problems that the project will solve and four phases of problem solving (problem/opportunity defined, selection of the best alternatives, implementation and monitoring) need to be studied thoroughly.

Undefined limits of scope of the corporate foresight project and the imbalance between the new technology to be introduced and the levels of ambition for changes to people, systems and organisations (corporations) overall may be avoided through well-defined milestone plans and clear responsibility charts.

In general, the foundations of corporate foresight project activities must carry the consensus of the stakeholders to assure that they are engaged in a worthwhile endeavour.

In Müller’s survey (2006), the participants assessing the current practice of strategic foresight in companies in Europe, highlighted the rationale behind the persisting problems of corporate foresight as lack of clarity about its objectives and performance. Thus, it justifies our attempt to emphasise setting clear objectives and incorporating them according to the stakeholders’ needs and expectations with continuous review, adaptation and improvement.

#### 4.2 Pitfalls in the planning of the corporate foresight projects

The planning is the second phase of the corporate foresight projects, where specifications are outlined for the guidelines in solving the identified problems defined in the initial phase. The flaws of the planning of the corporate foresight projects may be:

- 1 *The planning level is uniform; the plan contains too much detail for some users, and too little for others* – The dilemma of choosing a plan that is too broad in scope, with insufficient details and choosing a plan that is too detailed to map the achievement of goals throughout the corporate foresight project is the most serious pitfall in planning of the corporate foresight. Therefore, the planning needs to be done both at the milestone and activity levels.
- 2 *The planning tools are unwieldy* – Derived from the former planning flaw, unwieldy planning tools at the detail level may hinder communication. Corporate foresight project members must be able to see their share of work and not need to trace complicated tracks through a network with thousands of activities.
- 3 *The planning range is psychologically unsound* – The corporate foresight activities are concerned with the time horizon of planning. The concentration on the longer term may hinder problems since “*whilst a long time horizon provides the opportunity to develop a broad vision, most players’ expectations are for short-term policy and/or investment responses*” (Keenan and Miles, 2004). On the other hand, the tendency of focusing on the deadline rather than activities may result in low project priority and ineffective work.
- 4 *The planning method discourages creativity and encourages bureaucracy* – The former three flaws result in discouraging creativity and thus encouraging bureaucracy. The planning should be understood not only by the executers but also by the members, as well. Corporate foresight planning needs to be a group activity in order to create more committed organisations and cultures for the future.
- 5 *The planning estimates of time and cost are over-optimistic* – The cost of a foresight exercise depends primarily upon the nature and scale of involvement of participants and its duration (Keenan and Miles, 2004). The over-optimism raised in the corporate foresight project planning may be due to the plans that are cut arbitrarily and unrealistically or/and insufficient previous experience against which to judge the work content. On the other hand, due to the dilemma of time-horizons, unless the corporate project manager is able to live in both with the responsibility of the present and anticipate the future, “*he/she will make the present more difficult than it need to be and will unsuccessfully manage the future*” (Handy, 1993).
- 6 *The planning of resources overestimates their competence and capacity* – Following the former time and cost flaw, the competence of the corporate foresight project members and the time horizon devoted to the corporate foresight project needs to be formulated in order to take account of the actual constraints.
- 7 *The corporate foresight project calendar omits lost time* – The corporate foresight project planning needs to take into consideration of the undetected factors which may set back the capacity of the project.

- 8 *The plan omits activities* – Since the corporate foresight project activities are unique at nature with regard to the corporation they are instrumented, the list of activities needs to be adopted at the flow of the corporate foresight project.

#### 4.3 *Pitfalls in the organisation of the corporate foresight projects*

The structure for the corporate foresight project usually includes steering committee, project manager and a project team securing an expert support. The following are the statements of the pitfalls in organising:

- 1 *Alternative organisations for the project are not considered* – When selecting the appropriate organisation structure for the corporate foresight project results, it is necessary to consider *matrix* – where the structure combines the aspects of a functional organisation with those of a projectised organisation – *or task organisations*, rather than adopting the commonly used *hierarchical* or *bureaucratic* organisations. However, matrix structure is the most difficult system to maintain as the sharing of power is a very delicate proposition, thus making it the most complex organisational structure to maintain.
- 2 *The distribution of responsibility is not defined* – Failing to clarify responsibilities may limit cooperation and communication, and in return sets back the corporate foresight project.
- 3 *Key resources are not available when required* – Besides financial resources, the scope of foresight depends upon other resource factors such as “*time, political support, human resources, institutional infrastructure and the culture in which the exercise is embedded*” (Keenan and Miles, 2004). Lack of the necessary resources will delay the corporate foresight project activities or processes will begin to build those resources through corporate foresight projects.
- 4 *Key resources are not motivated* – Key resources of the corporate foresight project are the people who are involved in those activities within the organisation thus, their motivations is crucial for the commitment of the project results.
- 5 *Line managers are not committed* – It is crucial to have the line managers’ commitment in corporate foresight projects since corporate foresight activities are not limited to the project managers only. Corporate foresight is a project to be spread within the organisation and it aims to have the active involvement of the various stakeholders from foundation and throughout all the stages of the corporate foresight project. Commitment of various actors is what makes foresight activities different from just planning.
- 6 *Communication is poor* – corporate foresight project needs to be led by people provided with a structure within which they can communicate efficiently and effectively.
- 7 *The corporate foresight project manager is a technocrat, rather than a manager, so he cannot delegate, coordinate, and control* – corporate foresight project managers should be the ones with time and energy; who can plan, organise and work methodically; and be chosen for his/her leadership skills in order to inspire others.

#### *4.4 Pitfalls in the control of the corporate foresight projects*

Control of corporate foresight projects needs to be seen as a part of providing collaborative leadership from within the foresight team. Therefore, control is the reporting progress of the corporate foresight projects in relations to the plan; analysing variance between progress and the plan and finally, taking action to eliminate those defined variances. The flaws of controlling may be:

- 1 *The corporate foresight project manager and his team do not understand the purpose of control, they do not understand the difference between monitoring and controlling* – It is important to see the purpose of controlling as a tool to monitor progress and to take corrective action rather than a tool to use stick or punish the guilty.
- 2 *The plan and progress reports are not integrated* – The corporate foresight project plans are better off if written on the plan so that, the plan is reviewed whenever a report is done. Thus, the plan invites control, provides the necessary information to the corporate foresight project manager to allow him/her to analyse the deviations and to proliferate on it. Such integration of the plan and the reports will also encourage control by judging the effect of one activity going late on the duration of the project, by monitoring productivity from the productivity of individual activities and by assessing the quality before the last activity finished.
- 3 *There is no well-defined and formalised communication between corporate foresight project manager and project members* – Although it is beneficial to have informal communication within the corporate foresight project, it is crucial to have a formal, systemic review process for an effective control.
- 4 *The corporate foresight project manager has responsibility, but no formal authority* – If there is a power conflict between the project and the line manager, the project members are likely to have loyalty and priority problems. Thus, corporate foresight project manager needs to have the authority to control the project (Andersen and Jessen, 2003) which should be reflected in the corporate foresight project's organisation.

#### *4.5 Pitfalls in the execution of the corporate foresight projects*

Earlier we defined pitfalls and problems of foundation, planning, organising and controlling of corporate foresight projects, yet it is most important to understand the flaws of the execution of the project itself. The general pitfalls of the execution of corporate foresight projects may be:

- 1 *The complexity of coordinating a variety of resources is underestimated* – Variety of resources in corporate foresight projects may result in comprehension problems due to the unacquainted people trying to understand the task of achieving cooperation or technical methods that are too complicated to be fully understood by the users. Another pitfall of cooperation during implementation is that different people work by different rules and procedures which in return weaken cooperation and reduce the potential for project members to benefit from each others' experience.

- 2 *Changes to the plan or specification are uncontrolled* – Changes in the plan with regard to the progress in the corporate foresight project needs to be done accordingly without jeopardising the whole project.
- 3 *Activities are not completed and documented before others begin* – There are times when the corporate project managers may find project members work out of sequence, starting activities out of turn before previous tasks are completed. This is to stop the under-utilised project members becoming dissatisfied; however, if the results turn out to be other than expected, the work needs to be done in correct order.
- 4 *The targets of time, cost and quality are unbalanced* – The corporate foresight project manager must exercise the right to choose between perfection and time/cost over-runs in order to accept imperfect, yet adequate, solutions to be on time and to cost. The corporate foresight project manager needs to plan and control the quality throughout the project to ensure the imperfect, yet adequate solution.

In Müller's survey (2006), participants reported arguments such as "too long term orientation, high costs, inapplicable results and lack of time" to be put forth as most often against corporate foresight or against taking part in foresight processes.

#### 4.6 Pitfalls in the feedback and continuity of the foresight project

In our study, we propose to enlarge the pitfalls listed above by including a sixth stage of which we define as the "*feedback and continuity of the foresight projects*". This stage is very crucial for a better evaluation of the corporate foresight projects, as well as their dissemination within and outside the organisation. *Continuity* has been mentioned, but not elaborated in the literature (e.g. by Cuhls and Grupp, 2003) by bringing the distinction between a Pre- or Post-Foresight-Phase to an end and vitalising the importance of the continuity of the whole foresight process. Lack of continuity was also discussed (UNIDO, 2005) as a part of the conceptual problems and challenges in implementing regional foresight, thus due to the lack of continuity; foresight process was likely to collapse after the project or funding.

Ward and Chapman (1995) elaborated the four-phase characterisation of project lifecycle used by Adams and Barndt (1988) by breaking down the phases into eight stages. Table 2 describes those phases, stages and steps in the project lifecycle in which it also suggests a termination phase. Termination phase of the project lifecycle (which may also be called as the *turnover* or *post-project* phase (Kelley, 1982; cited in Bonnal et al., 2002) is so much associated with our proposed phases of '*execution*' and '*feedback and continuity*' of the foresight projects since it highlights the importance of the stages such as *deliver*, *review* and *support*.

The project termination phase is defined as having three distinct aspects, captured in the 'deliver', 'review' and 'support' stages (Ward and Chapman, 1995). Deliver stage involves verifying the actual performance as opposed to its designed performance followed by a 'delivery evaluation'. The latter focuses on the need for quality assessment and modification loops, including compensating for unanticipated weakness by developing unanticipated strengths.

**Table 2** Phases, stages and steps in the project lifecycle (adapted from Ward and Chapman, 1995, with additions by the current study)

<i>Phases</i>	<i>Stages</i>	<i>Stages in our study</i>	<i>Steps</i>
Conceptualisation	Concept	<i>Foundation</i>	Trigger event Concept capture Clarification of purpose Concept elaboration Concept evaluation
Planning	Design	<i>Foundation</i>	Basic design Development of performance criteria Design development Design evaluation
	Plan	<i>Planning</i>	Base plan Development of targets and milestones Plan development Plan evaluation
	Allocation	<i>Organising</i>	Base allocation Development of allocation Allocation development Allocation evaluation
Execution	Control	<i>Controlling</i>	Modification of targets and milestones Allocation modification Control evaluation
Termination	Deliver	<i>Execution + feedback and continuity of the foresight project</i>	Basic deliverable verification  Deliverable modification Modification of performance criteria Deliver evaluation
	Review	<i>Execution + feedback and continuity of the foresight project</i>	Basic review  Review development Review evaluation
	Support	<i>Execution + feedback and continuity of the foresight project</i>	Basic maintenance and liability perception  Development of support criteria Support perception development Development of support criteria Support evaluation

In the review stage, a documented audit is done after the delivery of the project. 'Review evaluation' stage involves the likely relevance and usefulness of review data for informing future project management practice. In our study, the review evaluation is necessary in order to set the criteria relevant to the changes in each stage in order to re-apply the company foresight projects. Review evaluation is essential in order to better design a next corporate foresight project and establish a continuous programme.

The last stage of the termination phase is the 'support' stage where it involved with the ongoing legacy of the project 'completion'. 'Support' may be repeated periodically since we propose a continuing company foresight project, rather than a one-time go.

Finally, the importance of observing Table 2 in a multidimensional way is highlighted by each step being considered in parallel or in an iterative sequence (Ward and Chapman, 1995). This may be supported by our integrated foresight project management proposal.

In our study, we define pitfalls of '*feedback and continuity*' of the corporate foresight project as follows:

- 1 *Corporate foresight project is not successful* – The overall assessment of the performance of the corporate foresight projects is important in order to highlight the aggregated benefits of the end-results.
- 2 *Corporate foresight project results are not communicated into the corporation* – As a part of the learning process, corporate foresight results need to be better communicated into the company knowledge base in order to create diffusion and higher commitment for successful project results. Concrete 'hands on' products such as a monthly magazine, an internet tool, etc. are suggested that could be given away to illustrate the practical utility of foresight (Becker, 2002).
- 3 *After the execution of the corporate foresight project, the project managers are withdrawn from the support and responsibility of the project* – Since we propose a continuum in the application of the corporate foresight project, support by the project managers need to be repeated where it involves the ongoing legacy of the project execution.
- 4 *Foresight projects are not redesigned/tuned according to the needs and expectations of the stakeholders* – The review of the corporate foresight project results will help in generating changes in accordance to the external and internal developments since the project started. Thus, any change in the needs and the expectations of the stakeholders should be identified and if needed be modified. This will eventually trigger off learning effects and make foresight predictions more accurate and more 'user-friendly/customer' oriented.
- 5 *For future implementation, the corporate foresight results are not looped into the project definition and company knowledge base for readjustment* – It is important to ensure that the project results are injected back into process (Thiry, 2004) for the continuum of the foresight project and corporate learning.
- 6 *Managers are mostly stuck with old knowledge instead of creating new knowledge for the future* – This statement is so much related with the learning process created by the use of foresight activities within corporations. It is a tool in helping to change the goals, structures and the behaviour of the corporation for a better anticipated future.



- 7 *Corporate foresight project is not re-applied at predetermined time cycles* – Lack of the continuity of corporate foresight projects will result in not building a company knowledge base and a lack of commitment to foresight activities.

## 5 12 Cs of corporate foresight projects

Having identified and considered corporate foresight as a project, we also take the lead in proposing to increase the defined components of a successful corporate foresight into 12 Cs that was previously identified as 5 Cs in the literature (Table 3).

**Table 3** Components of foresight

<i>Foresight phase</i>	<i>Constructs</i>	<i>Source</i>
Pre-foresight, foresight project	Content	<i>Proposed by the present study</i>
Pre-foresight, foresight project	Consensus	Irvine and Martin (1984)
Pre-foresight, foresight project	Commitment	Irvine and Martin (1984)
Foresight project	Concentration (long-time perspective)	Irvine and Martin (1984)
Foresight project	Competence	<i>Proposed by the present study</i>
Foresight project	Courage	<i>Proposed by the present study</i>
Foresight project	Curiosity	<i>Proposed by the present study</i>
Foresight project, post-foresight	Coordination	Irvine and Martin (1984)
Foresight project, post-foresight	Communication	Irvine and Martin (1984)
Pre-foresight, foresight project, post-foresight	Change	<i>Proposed by the present study</i>
Post-foresight	Continuity	<i>Proposed by the present study</i>
Pre-foresight, foresight project, post-foresight	Connectedness	<i>Proposed by the present study</i>

The most important aspects of foresight are identified by Irvine and Martin (1984) as 5 Cs. In our study, we propose to increase those defined components of successful corporate foresight to 12 Cs by incorporating the aspects of *content*, *competence*, *change*, *continuity*, *courage*, *curiosity*<sup>1</sup> and lastly but not finally *connectedness*.

- 1 *Content*: Content represents the information and experiences created by individuals, institutions and technology to benefit corporate foresight projects. Therefore, it is the most essential factor at the pre-foresight phase where the foundations of the corporate foresight activities are provided.

The content of the corporate foresight project is mainly defined in the inputs of the foundation phase. “*Who, what, when and where*” questions are answered in the general corporate foresight projects. It helps setting direction, identification and establishing methodological principles. The lack of such general guidelines will reduce the drive of the project and result in miscomprehension of the overall corporate foresight project by its members.

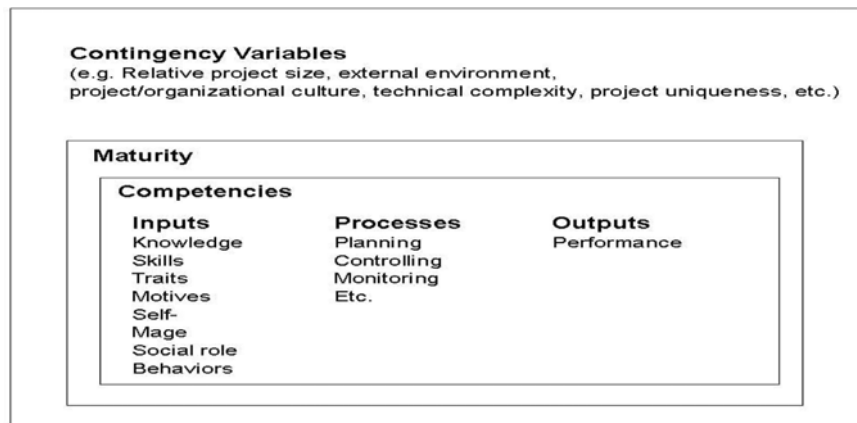
- 2 *Competence*: Competencies represent skills, abilities and knowledge needed to perform corporate foresight activities. Project participants’ competence is considered

by organisations and others to help guide human resource decisions. *Competence can be considered as a group of related knowledge, skills, and attributes that influences performance* (Parry, 1996; cited in Skulmoski, 2001), or an expanded definition would be as ‘competency may refer to a specific, observable behaviour that leads to superior performance’ (Ayer and William, 1998). Competence also includes behaviour such as the individual’s motives, traits and one’s self-image or social role (McClelland, 1973; Boyatzis, 1982; Spencer and Spencer, 1993; cited in Skulmoski, 2001). Competence also needs to be understood as a means and be continually developed with respect to the changes in the environment.

Corporate foresight activities may take place at three different levels: At the corporate level by corporate research or strategic development departments; at divisions, technology centres and business units; or at a combination of these two structural levels by a third virtual structure where temporary task forces are involved. Apart from those activities within the corporate level, corporations use external consultants. Within such integrated system, it is important to understand competence within the whole corporate foresight project process.

Skulmoski (2001) proposed an integrated project management competence and maturity framework (Figure 2) where competence is mediated by organisational project management maturity. Thus, the corporate foresight project members’ competence would not be put to effective use unless the organisation internalised it. On the other hand, it is important to consider the contingency variables where factors of external environment, project uniqueness and such may affect the competencies to have the greatest influence on successful outcomes.

**Figure 2** Integrated project management and maturity framework (Skulmoski, 2001)



- 3 *Change*: After the formulation of the original ‘5 Cs’ of foresight, comprehension was included in the formation by some scholars at some later stage to convert the ‘5 Cs’ to the ‘6 Cs’. This construct aimed to encourage those who were involved in foresight projects to understand the changes happening in their business, or professions, at a global level and to exert some control over these events. In our study, we propose re-positioning this construct as a part of the success factors of corporate foresight within the concept of *change*.

Change, in its broadest sense, is a planned or unplanned response to pressures and forces (Jick and Peiperl, 2003). Since the dynamics of change<sup>2</sup> in the corporate environment have increased strongly, foresight has become a very important tool to help overcome those changes. Therefore, foresight should be approached as not only a tool for selecting and prioritising R&D activities, but also as a tool to institute change within the organisation.

The need for a common direction of change in order to realise a certain future is highlighted by Seth (1986): “*Understanding the future in all its ramifications thus heavily impinges on ... our perceptions of change. We have a great deal more to do further our understanding of the pace at which different societies are managing or neglecting change, thus determining, for a group of people, a certain kind of future.*”

Thus, foresight begins with the identification – and monitoring – of trends of change and emerging issues and may be managed via an array of foresight methods and techniques; identifying and monitoring change; considering and critiquing the impacts of change; imagining alternative possible futures; visioning preferred futures; planning, team-building and implementing desired change (Schultz and Dost, 1997).

- 4 *Continuity*: Foresight should not be taken as a set of things to do for one time but rather a set of activities that continue for the life span of the corporation. It is defined in its core as “continuous process of making present entrepreneurial (risk taking) decisions systematically and with the best possible of their futurity, organising systematically the efforts needed to carry out these decisions, and measuring the results of these decisions against the expectations through organised, systematic feed-back” (Drucker, 1959). Therefore, the continuous application of the foresight activities is crucial for a corporate culture of strategic vision; i.e. repeating the foresight projects periodically and modifying objectives and plans as needed. This continuum of activities will help generating the dissemination of foresight practice and capacity within the society by means of communicated culture, knowledge and behaviour.
- 5 *Curiosity*: Foresight activities encourage innovation therefore it urges creativity. This capacity is mainly motivated by one’s curiosity where provoked in exploration, investigation and learning. Curiosity-embedded foresight activities confer competitive advantage to those companies which foster anticipation for their future.
- 6 *Courage*: In order to anticipate and project long-term developments, present day decisions need to be made and actions to be taken. This part of the foresight activities is so much connected with the courage of the participants of the project. Courage is in sync with the term implementation, and thus creating one’s own future.
- 7 *Connectedness*: Integration<sup>3</sup> is the process of combining or accumulating its components into a larger defined whole. An integrated decision structure for the business was suggested by Drucker (1959). In our current study, we define the 12th success factor of ‘connectedness’ as the integrating item in the corporate foresight projects. It defines the integration of the normative, strategic and operational level of the foresight projects with the goals, structure and the behavioural components of the foresight management (Bleicher, 1991; Alsan and Öner, 2004; Öner and Sarıtaş, 2004). Organisations are defined as complex open systems since they exchange

resources with the environment, and consist of interconnected components that work together. They are treated as instances of complex adaptive systems (Holland, 1975; cited in Anderson, 1999) where the interactions of individuals (or/and components) are connected together and they have the capacity to change and learn from experience. Connectivity<sup>4</sup> is the capability of foresight to be attached to the other systems within and outside the company. Therefore, connectedness may be the answer in efforts to integrate micro-, meso- and macro-level aspects in foresight activities in the companies. Thinking about future needs to be integral to the cultural, managerial and community based actions (Seth, 1986). Therefore, the term also helps indicating the integration of socioeconomic orientation that shapes the foresight activities, along with the scientific and technological challenges.

## 6 A new framework

Our study proposes a new framework by redefining and extending the pitfalls and challenges of corporate foresight projects in order to better instrument their results into actual changes in corporations. Although, corporate foresight activities are becoming more crucial to look beyond close environments, there are number of problems of their use and integration that need to be proliferated.

Therefore, we aim to offer a new framework in Tables 4a and 4b for considering those pitfalls that are based on the work of Andersen's et al. (1996) and our study. We also propose 12 success factors associated with the pitfalls defined in each of the foresight project stages in a further attempt to explain the *level of reported success of conversion of foresight project results into actual changes in corporations*.

Tables 4a and 4b are the statements of a new approach in order to describe the factors affecting the success of corporate foresight activities with respect to understanding the *pitfalls* of foresight projects. Taking reference to such a framework, foresight results may be better delivered and disseminated in corporations with concrete results and actual changes in organisations.

**Table 4a** Linking pitfalls in corporate foresight projects with success factors

<i>Pitfalls in corporate foresight projects</i>	<i>Success factors</i>
<i>A. Foundation</i>	
1 Insufficient support for the corporate foresight project The corporate foresight project plans are not aligned with the business plans The principles and policies of corporate foresight project work are not defined	Commitment, content, change, consensus
2 Poor corporate foresight project definition The goals for the corporate foresight project are imprecise The limits of the scope of the corporate foresight project are not set The levels of ambition for changes to people, systems and organisation are not in balance with the new technology to be introduced	Content, change

**Table 4a** Linking pitfalls in corporate foresight projects with success factors (continued)

<i>Pitfalls in corporate foresight projects</i>	<i>Success factors</i>
<i>B. Planning</i>	
1 The planning level is uniform; the plan contains too much detail for some users, and too little for others	Change, consensus, communication, content
2 The planning tools are unwieldy	Communication, change, content, competence
3 The planning range is psychologically unsound	Concentration on the longer term, competence, continuity, curiosity
4 The planning method discourages creativity and encourages bureaucracy	Change, coordination, courage
5 The planning estimates of time and cost are over-optimistic	Commitment, competence, consensus, change
6 The planning of resources overestimates their competence and capacity	Competence, change
7 The corporate foresight project calendar omits lost time	Content, change, competence
8 The plan omits activities	Continuity, change, competence
<i>C. Organising</i>	
1 Alternative organisations for the project are not considered	Content
2 The distribution of responsibility is not defined	Commitment, content, coordination
3 Key resources are not available when required	Commitment, communication
4 Key resources are not motivated	Commitment
5 Line managers are not committed	Commitment
6 Communication is poor	Communication, commitment
7 The corporate foresight project manager is a technocrat, rather than a manager, so he cannot delegate, coordinate and control	Competence

**Table 4b** Linking pitfalls in corporate foresight projects with success factors

<i>Pitfalls in corporate foresight projects</i>	<i>Success factors</i>
<i>D. Controlling</i>	
1 The corporate foresight project manager and his team do not understand the purpose of control, they do not understand the difference between monitoring and controlling	Change
2 The plan and progress reports are not integrated	Content
3 There is no well-defined and formalised communication between corporate foresight project manager and project members	Communication, continuity
4 The corporate foresight project manager has responsibility, but no formal authority	Competence, commitment

**Table 4b** Linking pitfalls in corporate foresight projects with success factors (continued)

<i>Pitfalls in corporate foresight projects</i>	<i>Success factors</i>
<i>E. Execution</i>	
1 The complexity of coordinating a variety of resources is underestimated The task of achieving cooperation between unacquainted people is not understood Different people work with different rules and procedures The technical methods are too complicated to be fully understood by the users	Coordination, communication, content, change, competence
2 Changes to the plan or specification are uncontrolled	Content, communication, coordination
3 Activities are not completed and documented before others begin	Content, communication
4 The targets of time, cost and quality are unbalanced	Content, continuity
<i>F. Feedback and continuity of the foresight project</i>	
1 Corporate foresight project is not successful	Courage, long-term concentration, commitment, change, consensus, continuity
2 Corporate foresight project results are not communicated into the corporation	
3 After the execution of the corporate foresight project, the project managers are withdrawn from the support and responsibility of the project	
4 Foresight projects are not redesigned/tuned according to the needs and expectations of the stakeholders	
5 For future implementation, the corporate foresight results are not looped into the project definition and company knowledge base for readjustment	
6 Instead of creating new knowledge for the future, managers are mainly stuck with the old ones	
7 Corporate foresight project is not re-applied at predetermined time cycles	

In our study, we propose that corporate foresight activities may be better managed if sufficient attention were given to each stage of the project and associated with the proposed 12 success factors.

## 7 Conclusion and future work

The success of corporate foresight projects depends on different factors. However, based on the identified five important aspects of the foresight projects defined in the literature, we propose seven additional aspects in order to help assessing the level of the reported success of those projects. In our paper, we aim to support the reliability of the foresight studies as they have been implemented and bring a new methodological challenge.

Our paper has set the initiative of a new conceptual model, in our future research, we aim to analyse the level of the reported success of foresight project results of two companies. The first initiative will be at an international company that has been involved

in foresight activities since the year 2005, with preferred scenarios for 2015. The latter will be a local company that intends to occupy itself with the applications of corporate foresight project. The model of assessment will be based on our proposed framework, which is characterised by approaching foresight as a project and associating it by the redefined success factors of corporate foresight projects.

Another issue to be addressed in the future is the need to understand the *optimism/pessimism* of the foresight participants from their beliefs about future which may affect the success of foresight project results. We aim to address the question of “could degree of happiness bring different approaches, perspectives or priorities to foresight studies?” by integrating *Oxford Happiness Index* as a measuring scale and apply it among managers of the earlier-defined international company, as well as the MBA, PhD and undergraduate students at a private university.

## References

- Adams, J. R. and Barndt, S. E. (1988) ‘Behavioral implications of the project lifecycle’, in Cleland, D. I. and King, W. R. (Eds): *Project Management Handbook* (2nd ed.) Von Nostrand Reinhold.
- Alsan, A. (2007) ‘Corporate foresight in emerging markets: action research at a multinational company in Turkey’, *Futures*, accepted for publication.
- Alsan, A. and Öner, M.A. (2003) ‘An integrated view of foresight: integrated management model’, *Foresight*, Vol. 5, No. 2, pp.33–45.
- Alsan, A. and Öner, A., (2004) ‘comparison of national foresight studies by integrated foresight management model’, *Futures*, Vol. 36, No. 8, pp.889–902.
- Andersen, E., Grude, K.V. and Haug, T. (1996) *Goal Directed Project Management*, 2nd ed., Coopers & Lybrand, Great Britain.
- Andersen, E.S. and Jessen, S.A. (2003) ‘Project Maturity in Organizations’, *International Journal of Project Management*, Vol. 21, pp.457–461.
- Anderson, P. (1999) ‘Complexity theory and organization science’, *Organization Science*, Vol. 10, No. 3, pp.216–232.
- Ayer, F.L. and William, R.D. (1998) ‘Project management competence and competencies’, *PM Network*, June.
- Becker, P. (2002) ‘Corporate foresight: a first overview’, Working Paper.
- Bleicher, K. (1991) ‘Das Konzept Integriertes Management’, Campus, Frankfurt/New York.
- Bonnal, P., Gourc, D. and Lacoste, G. (2002) ‘The life cycle of technical projects’, *Project Management Journal*, pp.12–18.
- Bryson, J.M., Van de Ven, A.H. and Roering, W.D. (1987) ‘Strategic planning and the revitalization of the public service’, in Denhardt, R. and Jennings, E. (Eds): *Towards a New Public Service*, Extension Publications, Missouri, Colombia, MO, pp.55–75.
- Burmeister, K., Neef, A. and Beyers, B. (2005) *Corporate Foresight – Unternehmen gestalten Zukunft*, Murmann Verlag.
- Cuhls, K. and Grupp, H. (2003) ‘Status and prospects of technology foresight in Germany after ten years’, *Fraunhofer Institute for Systems and Innovation Research*. Available online at: [http://www.e-innovation.org/stratinc/str\\_intel\\_articles.html](http://www.e-innovation.org/stratinc/str_intel_articles.html) (accessed on 28 August 2007).
- Daheim, C. and Uerz, G. (2006) ‘Corporate foresight in Europe: ready for the next step?’, Paper prepared for *The Second International Seville Seminar on Future-Oriented Technology Analysis: Impact of FTA Approaches on Policy and Decision-Making – Seville 28–29 September 2006*. Available online at: <http://forera.jrc.es/fta/programme.html> (accessed on 28 August 2007).

- Drucker, P.F. (1959) 'Long range planning: challenge to management science', *Management Science*, Vol. 5, No. 3, pp.238–249.
- Englund, R.L. and Graham, R.J. (1999) 'From experience: linking projects to strategy', *Journal of Product Innovation Management*, Vol. 16, pp.52–64.
- Gilbert, A. (1976) 'Growth pole strategies in less developed countries', in Gilbert, A. (Ed.): *Development Planning and Spatial Structure*, Wiley, London, pp.1–19.
- Glenn, J.C. and Gordon, T.J. (2001) *State of Future*, American Council of the United Nations University, Washington, DC.
- Godet, M. (2001) *Creating Futures: Scenario Planning as a Management Tool*, Economica Ltd, London.
- Handy, C. (1993) *Understanding the Organizations: How Understanding the Ways Organizations Actually Work Can be used to Manage Them Better*, Oxford University Press, New York, pp.331–332.
- Horton, A. (1999) 'Forefront: a simple guide to successful foresight', *Foresight*, Vol. 1, No. 1, pp.5–9.
- Irvine, J. and Martin, B. (1984) *Foresight in Science: Picking the Winners*, Pinter, London.
- Jick, T.D. and Peiperl, M. (2003) *Managing Change: Cases and Concepts*, 2nd ed., McGraw-Hill/Irwin, Burr Ridge, IL.
- Keenan, M. and Miles, I. (2004) 'Technology foresight: an introduction', *Foresight Training Workshop*, Gebze, Turkey.
- Klarqvist, B. (1993) 'A space syntax glossary', *Nordisk Arkitekturforskning*, Vol. 2, pp.11–12.
- Martin, B. (2001) 'Technology Foresight in a Rapidly Globalizing Economy', invited presentation at the International Conference on 'Technology Foresight for Central and Eastern Europe and the Newly Independent States', Vienna, AUSTRIA, 4–5 April, 2001. Available online at: [https://www.unido.org/file-storage/download/?file\\_id=12224](https://www.unido.org/file-storage/download/?file_id=12224) (accessed on 9 September 2007).
- Martin, B.R. and Irvine, J. (1989) *Research Foresight: Priority-Setting in Science*, Pinter Publishers, London/New York.
- Müller, A. (2006) *Strategic Foresight in Companies. An international survey on trends and futures research processes*. Unpublished paper, 2006. Results to be published soon. Available online at: <http://www.strategicforesight.ch> (accessed on 28 August 2007).
- Neef, A. and Daheim, C. (2005) 'Corporate foresight: the European experience', in Wagner, C.G. (Ed.): *Foresight, Innovation, and Strategy. Toward a Wiser Future*, Bethesda 2005, pp.223–241.
- Öner, M.A. and Sarıtaş, Ö. (2004) 'Systemic analysis of UK foresight results: joint application of integrated management model and roadmapping', *Technology Forecasting and Social Change*, Vol. 71, pp.27–65.
- Schultz, W. and Dost, A. (1997) NHS: Systemic Approaches to Foresight, King's Fund European Symposium, *Health Futures: Tools to Create Tomorrow's Health Systemé*, London, 10–11 November 1997. Available online at: <http://www.wolfson.ox.ac.uk/~wendy/resources/nhsforesight.html> (accessed on 28 August 2007).
- Seth, S.C. (1986) 'Futures research: the need for anticipatory management', *Futures*, pp.366–368.
- Skulmoski, G. (2001) 'Project maturity and competence interface', *Cost Engineering*, Vol. 43, No. 6, pp.11–18.
- Slaughter, R.A. (1993) 'Futures concepts', *Futures*, pp.289–314.
- Slaughter, R.A. (1996) 'Foresight beyond strategy: social initiatives by business and government', *Long Range Planning*, Vol. 29, pp.156–163.
- Stewart, W. (2001) 'Balanced scorecard for projects', *Project Management Journal*, Vol. 32, No. 1, pp.38–53.
- Thiry, M. (2004) 'For DAD: a programme management life-cycle process', *International Journal of Project Management*, Vol. 22, pp.245–252.



- UNIDO (2003) *Technology Foresight Summit*, Technical Report, Budapest, Hungary.
- UNIDO (2005) *Technology Foresight Manual I, II*, Vienna, Austria. Available online at: <http://www.unido.org/cp> (accessed on 28 August 2007).
- Ward, S.C. and Chapman, C.H. (1995) 'Risk-management perspective on the project lifecycle', *International Journal of Project Management*, Vol. 13, No. 3, pp.145–149.
- Wengler, L. and Svenson, O. (1982) 'Self-image and predictions about future events', *Scandinavian Journal of Psychology*, Vol. 23, pp.153–155.
- Wengler, L. and Rosen, A-S. (2004) 'Measuring optimism–pessimism from beliefs about future events', *Personality and Individual Differences*, Vol. 28, No. 4, pp.717–728.

### **Notes**

- 1 The items of *courage* and *curiosity* are suggested by PhD candidate fellow Ibrahim Uzpeder, 2006 as used by Ericsson in 2002.
- 2 The key drivers of change in the economy over the coming decades are summarised as increasing competition, increasing constraints on public expenditure, increasing complexity and the increasing importance of scientific and technological competencies (Martin, 2001).
- 3 Integration is a static global measure. It describes the average depth of a space to all other spaces in the system (Klarqvist, 1993).
- 4 Connectivity measures the number of immediate neighbours that are directly connected to a space. This is a static local measure (Klarqvist, 1993).