

# An integrated view of foresight: integrated foresight management model

**Alper Alsan and M. Atilla Oner**

Alper Alsan has a doctorate in the Engineering Management Programme at Marmara University, Istanbul, Turkey and is also Director at Siemens Turkey – Corporate Strategies and Consulting Department, Kartal, Istanbul, Turkey. E-mail: alper.alsan@siemens.com.tr  
M. Atilla Oner is Assistant Professor in the Department of Business Administration and Head of the Manufacturing and Technology Strategies Research Group, Yeditepe University, Kayisdagi, Istanbul, Turkey. E-mail: maoner@yeditepe.edu.tr

**Keywords** Forecasting, Integration, Knowledge, Systems, Organization, Strategic planning

**Abstract** The use of foresight as a tool in policy and strategic decision making increased especially in the last decade of the twentieth century in order to enhance competitiveness and innovation of nations, regions, corporations and even individuals. Coupled with this development a lot of different definitions which partly include part of the others emerged in the literature. However, it was observed that none of these definitions were capable enough to represent an integrated and holistic view about the impact of foresight on the management of the future. In this article, the integrated foresight management model is introduced which is based on the integrated management model but enriched by a knowledge-people-system-organisation framework. The current list of definitions was tabulated in this new model and the vacancies in the model were filled out. This integrated foresight management model can help practitioners in designing national, regional or corporate programs in developing necessary organisational structures, deliverables and behaviours on policy, strategy and operational levels of management.

## Introduction

The accumulation of the available literature on the definition of foresight presents a picture which tries to be comprehensive by covering all aspects related with the future and its impact on all elements of life. Although the definitions of Irvine and Martine (1984) and Coates (1985) are quite extended, the following authors in the 1990s have had the opportunity to discuss these definitions and fill in the gaps such as wealth creation and quality of life targets (Georghiou, 1996), main barriers (Slaughter, 1996), the need for personal

awareness (McDermott, 1996), competencies (Robinson, 1996), freedom as a basic goal (Bell, 1998), priority setting (Rappert, 1999), feedback into strategic planning (Gavigan and Scapolo, 2001), levels of foresight (Ruff, 2001) and people focus (Kozlowski, 2001).

These augmented definitions are fragments of a big picture. Foresight clearly deals with the future and especially with the set of many possible futures trying to define the preferable future. It avoids prediction or single point forecasts. It could be inspired by the analysis of historical data but this is not a prerequisite. The definition of the big picture becomes valuable when it is sorted out and organized by a knowledge-people-system-organisation (KPSO) framework and by applying an integrated management model (IMM) to the definitions above.

In this article, we are going to start with considering the levels of IMM. Foresight is not only a strategic or normative, i.e. policy, activity. It has an impact on the formulation and especially the decision making at all levels. Hence, foresight is not planning but a pre-phase of planning on any level of IMM enhancing priority setting, again on each level. We will also explain the KPSO framework and its relation to any foresight activity, which will be followed by a section describing the expectations from a model. Second, the IMM



The Emerald Research Register for this journal is available at <http://www.emeraldinsight.com/researchregister>

The current issue and full text archive of this journal is available at <http://www.emeraldinsight.com/1463-6689.htm>

and KPSO frameworks will be modified and another framework, i.e. claritas-unitas-integrates-consonante, will be added to these two as a supporting feature. Third, the integrated foresight management (IFM) model is going to be constructed, the literature concerning comparative national foresight studies will be reviewed using this model and the missing features will be added to IFM in order to have a complete model.

## The keys: integrated management model and knowledge-people-system-organisation frameworks

### Integrated management model

This concept stems from Bleicher (1991) of St Gallen University who developed the “St Gallen management concept” of Ulrich (1984) and named it as “The concept of integrated management”. Bleicher (1991) builds this concept, based on the functions of management, which Ulrich defines as forming, steering and development. The concept of integrated management in Figure 1 is characterised by a two-dimensional structure of the problem areas of management: the impact of time (horizontal view) and constituting elements (vertical view).

On the horizontal view, different management levels are defined according to the time dimension which requires the execution of different activities. While the normative management aims to secure the survival and growth of an organisation, strategic management is occupied with the construction, maintenance and utilisation of success potentials. The operative management is responsible for the implementation of normative and strategic aims. On the vertical view, the basic elements of management are distinguished by structures, goals and behaviour. This consideration is based on the assumption that the management activities influence the organisational activities in such a way that the structures are manipulated, goals are determined and a basic and agreed behavioural pattern is

created. The structure covers, on one hand, the order of elements in a system and their relationships, and on the other hand, the instruments for the generation of such arrangements.

On the normative level, the constitution of the organisation is the basis which is realized by the organisation and management systems on the strategic level. On the operative level, the structure is reflected in processes. Goals could be quantitative or qualitative. The forming, steering and development activities are related to goals. The behaviour comprises both internal social and cultural aspects and the integration of the organisation with its environment. According to Bleicher (1991), the normative dimension establishes behaviour and the strategic dimension intends to lead this behaviour. The operative dimension deals with the performance of work processes, which is entirely shaped by employee management.

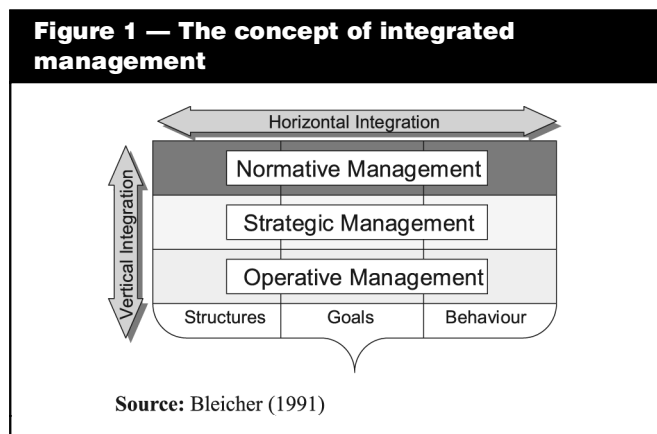
Each field in the integrated management model deserves a detailed explanation in order to clarify its content. Bleicher (1991) proposes a profiling method which enables the construction of an organisational profile for assessment. Parameters with two extremes are developed reflecting the relevant management aspect for each field.

Mission statements should describe the overall direction and orientation for the strategic and operative management in the normative goals. The parameters, with their extremes, are as follows:

- internal direction of these missions (individual economic/social economic);
- time perspective of the goal (short-term/long-term);
- chance perspective (keep it/progressive);
- risk perspective (disturbing/vulnerable);
- objective performance goals (weak/strong);
- financial value goals (weak/strong);
- ecological goals (weak/strong);
- social goals (weak/strong).

The constitution of any organisation determines the order and regulations within the normative structures. While the rights and relations of the owners are important for this constitution, the rules of conflict management also play a vital role. In order to pursue the economic goals, the internal construction of the organisation with the available legal design tools with a humanistic social system becomes crucial. The corresponding parameters with their extremes are as follows:

- representation of interests in board (shareholder/stakeholder);
- art of conflict resolution (confrontation/consensus);
- economical, legal and social structure (non-differentiated/differentiated);
- distance of the management to real life (close-operative/far-strategic);



- competence distribution of management (single-level/multiple-level);
- division of executives (directorial, CEO/staff, team);
- sense of responsibility of the top team (focusing on existing business potentials, short-term/multiplying business potentials, long-term);
- rationale of the top team (monitoring/consulting).

Organisational culture forms the normative behaviour which includes the cognitive abilities of an organisation and the attitudes of its members towards duties, tasks, products, fellow members, management and organisation which shape the perceptions and preferences against events and developments. Organisational culture acts as a catalyst between the past-oriented values and forward-based behaviour in the social evolution. The related parameters, with their extremes, are as follows:

- cultural openness (clear limits to outside/open outside oriented);
- attitude towards change (hostile/ready and open);
- orientation of management (change from top-down/change from bottom-up);
- subcultural differentiation (uniform value system/functionally different, but joint value system confined to division);
- understanding of cultural change tools (tools, technocratic structures and processes/evolution, rewarding of creative developments);
- value added orientation of management (cost saving/focus on new application potentials);
- membership (praising loyalty/praising individual performance);
- culture leverage (collective, us/individual, hero).

Based on the organizational culture and constitution, organization policy delivers long-term and overall goals and a basic orientation for the strategic management in the strategic goals. The corresponding parameters with their extremes are as follows:

- supply of performance (broad/narrow);
- individuality of problem solving (standardized/individual);
- competitive posture (defensive/offensive);
- leader-follower behaviour (imitation/innovation);
- value-added activities (cost oriented rationalisation/customer focused optimization);
- dependency of value-added activities (independent/networking);
- deployment of resources (fixed/flexible);
- performance of resources (specialized/generalist).

The strategic goals should be supported with the corresponding forming of the organization within strategic structures. These structures are supplemented with

management systems which steer the problem, management and cooperation behaviour toward the desired direction. The parameters of strategic structures with their respective extremes are as follows:

- focus (issue-oriented/person-oriented);
- reference points (formal rules/symbols);
- extent of rules (single rules, efficiency oriented/framework rules, effectivity oriented);
- time orientation (unlimited period/predictable period);
- synergy orientation (central/decentral);
- hierarchy (high/low);
- organizational development (inwards, towards efficiency/outwards, towards effectiveness)
- starting point of organizational development (top-down/bottom-up)

Strategic behaviour is concerned with the development of the problem-solving skills of the members of the organization in the light of the values and norms supplied by the organizational culture. People are the only reason behind any kind of problem-solving activity which results in the implementation of strategic programs, based on the mission of the organization. This transformation occurs within a framework which is defined by the organisation structures and management systems. The parameters of strategic behaviour with their respective extremes are as follows:

- level of participative behaviour for management decisions (low/high);
- focus of behaviour development (individual/team);
- desired management behaviour (risk-averse/entrepreneurial);
- desired competency potential (specialist/generalist);
- authority development (institutional, hierarchy based/communication, specialist based);
- focus of desired responsibility (dependence, member only executes/ delegation, autonomous);
- place of behaviour development (on the job/off the job);
- type of desired learning behaviour (vertical, horizontal).

According to Bleicher (1991), the steering function should transfer all the normative and strategic goals into operational actions. This activity creates execution of specific objects. The relative situations demand not profiling, but the creation of management actions according to objective criteria. The problem-solving process of operative management mainly deals with the controlling of single orders and tasks, the adaptation of the structures and management systems and also the behaviour of the members to the demand of the current situation.

Bleicher (1991) provides a sample set of techniques for the methodological focus according to the objects of operative management. Examples of management techniques for operative goals are:

- goal setting techniques;
- problem identification and diagnosis;
- generation of alternatives;
- assessment, evaluation and decision making techniques; and
- order definition and instructions.

In the case of operative structures, the set of techniques could be:

- survey techniques;
- representation techniques;
- implementation methodologies;
- organisational development.

An exemplary set of social techniques for change in operative behaviour are:

- behaviour diagnosis;
- creativity techniques;
- motivation techniques;
- group dynamics.

Shortly, we can claim that on the normative level foresight enhances policy formulation via identifying critical and emerging technologies and societal developments and trends. On the strategic level, foresight helps in strategy formulation by enabling the areas of strategic research. On the operative level, it could provide early warning and caution; however, the integration of operational actions with normative and strategic decisions is more critical at this level since the decisions today define the future tomorrow.

### **Knowledge-people-system-organisation framework**

The people-system-organisation (PSO) framework stems from the goal directed project management methodology of Andersen et al. (1995). The greater part of project literature concerns technical projects, such as construction of bridges, roads, airports or oil platforms. But there should be a broader perspective for project management. PSO projects are projects where development of a "system" (a physical product or object), development of "people" (members or customers of that organization), and "organizations" (which produce procedures) will occur simultaneously.

The PSO framework has been extended with knowledge (K), which is the collation of information. Hence, KPSO stands for knowledge, people, system, and organization (Öner and Baçoğlu, 2000). The literature survey has shown that there is a great emphasis on the knowledge dimension in foresight.

The KPSO concept emphasizes the importance of balancing all four elements, knowledge, people, system and organization. "S" stands for technical outcomes or goals of the project. It often represents what we can "touch and feel" in the project. For example, in a construction project, the new

building is the "S". The most common failing in project work is to focus too strongly on the technical content.

In typical organizational development projects the situation is reversed. These are only concerned with developing people in the organization and relationships between them. There is not enough emphasis on developing routines and procedures that will support the changes required in the organization. KPSO projects are projects where the result should be a "composite product" balanced in all four dimensions.

One of the most important and characteristic aspects of project work is the extent to which people involved in the project, and who will use the results, are invited to participate in the work. One extreme is the "purely specialist project", the other extreme is the "purely process-oriented project". In purely specialist projects all the work is performed by specialists without any form of cooperation or consultation with the end users. There is no place for user cooperation. In purely process-oriented projects, on the contrary, everyone is encouraged to become involved and the project is allowed to be dominated by whatever problems and possibilities the participants see as being most important at any given time. The process itself determines the progress of the project.

All KPSO projects are "mixed" projects. They contain elements both from the process-oriented approach and from the specialist project. As will be shown later, all foresight projects should also have a mixed nature. They are neither "purely specialist projects", which are focused on only expert views, nor "purely process-oriented projects", which only focus on process and large-scale involvement. Foresight has now entered a stage where it should be considered with this KPSO "mixed" project approach.

### **What is expected from a model?**

Before introducing the integrated foresight management (IFM) model it is necessary to discuss the basic features of a model. One of the most comprehensive assessments of models was developed by Deutsch (1963). He identifies three basic criteria for choosing among models in either the physical or social sciences and he suggests that the quality of a concept or a model depends on its:

- economy;
- significance;
- explanatory or predictive powers.

If the model identifies the true aspects of a phenomenon or process and thereby produces a picture of reality that is simpler than reality itself, then it can be said to model the "economical". In the second place, the better model is the one that has more significance, the one that focuses attention on aspects or relationships that are not already obvious or that are not trivial.

Finally, the better model is the one that has the greater "explanatory or predictive capacities". To be predictive, a model must have:

- rigor;
- combinatorial richness;
- organizing power.

Rigor is the capacity of a model to produce unique answers – regardless of who uses it. Combinatorial richness refers to the range of hypotheses the model generates, the number of interesting features and relations it identifies. Organizing power consists of the ability of a model or concept to explain processes other than those it was originally designed to explain, its ability to account for new phenomena.

In this section, the framework for comparison will be constructed based on two approaches: the KPSO framework and the integrated management model (IMM). The combined usage of these frameworks integrates different views on foresight, e.g. normative and strategic views, and hence becomes economic. This also focuses the attention on the integration between levels and elements of management, distinguishes the non-trivial issues such as knowledge and operative management and leads to a significant model.

The predictive power of IFM lies in the definition of its fields. Once the features of its fields are defined then the model can be rigorously used for any foresight study. Combinatorial richness stems from the combination of the nine fields, which can generate a wide range of hypothesis and the relations between the fields. Organizing power again comes from the exclusivity and the dependence of the fields which explain the foresight process, including new phenomena such as the evolution of generations of foresight.

Before this construction, the timeframe for the integrated management model will be designed and the overall approach for the integration between levels and elements of management will be discussed.

## **Modifications of IMM and KPSO**

### **Discussion of the IMM timeframe**

An important dimension of the IMM is the time period associated with each level. Graf (1999) also distinguished these levels based on the work of Bleicher (1991) and shows that, on the normative level, the required time perspective for foresight is ten years and more, whereas on the strategic level, it is bounded by five years, as in Figure 2. Operative management is concerned with a time frame of up to one-and-a-half years.

Knowledge is divided into two parts. Knowledge about the past is “analysis” and knowledge about the future is “foresight”. This underlies the different work packages which should be done in an analysis study and a foresight study. Each management level requires both studies with similar timeframes.

Slaughter (1996a, b, c) discusses the same issue by elaborating on the extended “present” in Figure 3. According to his definition, the “present” depends on the activity pursued by the human beings and hence different activities

require different “presents”. This distinction between different activities and timeframes can help in defining the content of foresight studies for different goals and objectives.

According to his definition, six different “presents” could be developed, as seen in Table I. While all “presents” are designed such that they cover the next “x” years, only “200 years” includes the previous and the next 100 years. This approach is very similar to Graf (1999). “One year present” is appropriate for some goals but it is too short. “Ten years” is not enough to assess the medium-to-long-term impacts of the related decision; “20 years” is required for the analysis of the themes such as economic reform, life standards and social security; “50 years” is necessary to understand themes such as environment and cultural change. While “100 years” is required for developing historical and futuristic theories, “200 years” provides a macro-view of history.

While Bleicher (1991) combines the levels of the integrated management model with different timeframes, Slaughter (1996a, b, c) introduces a much more integrated concept – “present” – which is extended depending on the activity. These two approaches could be synthesized to generate a more comprehensive timeframe such that it also fulfils the requirements of the foresight studies, strategic management decision and operative actions based on the levels and “presents”.

The normative level includes a timeframe from eight to 30 years which has a median value of 19 years and is very close to the 20 years time period of many nation foresight exercises. This approach includes also the “present” approach of Slaughter (1996a, b, c) and enables the discussion, not for the next 20 years, but also a discussion which includes ten years before and after. On the strategic level, the timeframe from three to seven years has a median value of about five years, with two years as the interval before and after. On the operative level, the median value of from one to three years is one-and-a-half years with the same duration as the interval before and after. This is also quite relevant for business decisions since most of the budget planning starts from two quarters or half a year before the next planning period.

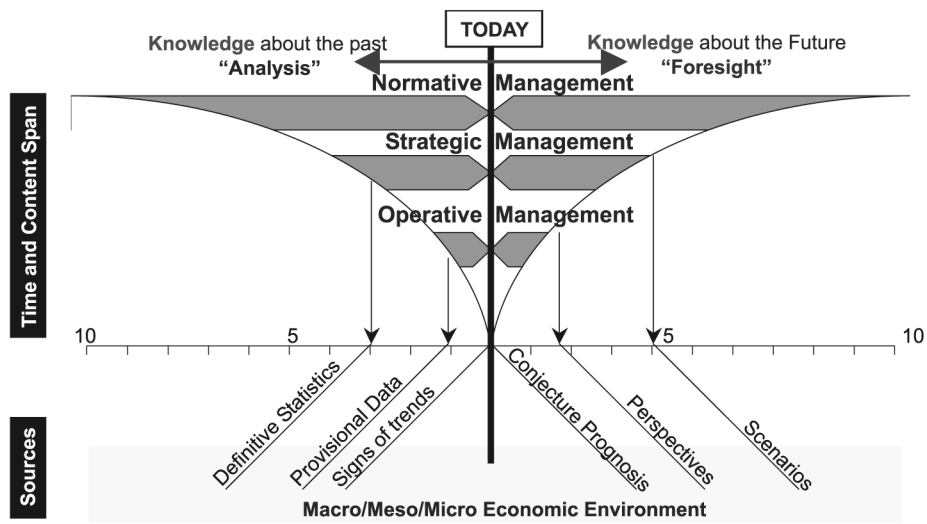
At this point it would also be wise to remember what Davis (1986) mentioned about foresight. He argues that “foresight” is anticipating which events are likely to occur more than one minute into the future. This definition includes all future with unlimited time horizon.

Throughout the rest of the study the following structure is going to be used when discussing the time dimensions of the levels of management in IMM:

- normative level: eight to 30 years;
- strategic level: four to seven years;
- operative level: one to three years.

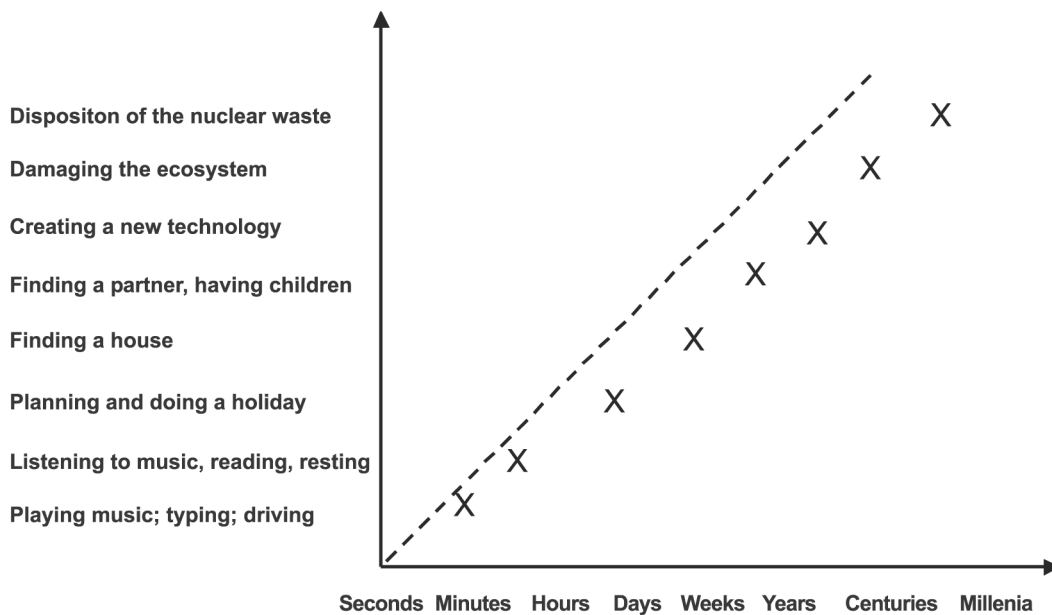
Operations could cover only one activity, which takes one day or one week, or a bunch of activities which might take

**Figure 2 — Levels of management and the need for knowledge**



Source: Graf (1999)

**Figure 3 — Different time-frames and activities**



Source: Slaughter (1996a,b,c)

even several months. Schaffer (1988) argues that a breakthrough strategy could only be realised by focusing on result-oriented business impact projects that will have an immediate, measurable effect on some aspect of a strategic direction. These projects will have short-term goals for about four to six months. However, these

projects will demonstrate a tangible achievement – which should be duplicated or multiplied. If it is considered that there will be at least three or more units it is clear that it could take from one-and-a-half to three years for an operation to be successfully implemented across the whole corporation.

**Table I — Characteristics of “presents”**

Present	Characteristics
<b>One year</b>	The time it takes planet earth to circle the sun once Cycle of seasons Unit of time measurement for human lives Farming and crop rotation
<b>Ten years</b>	Sizeable chunk of a human lifetime Long enough to provide insight into dynamic processes Ideal for noting environmental and ecological factors A reasonable horizon for testing new products and services The time it takes to plan and build major infrastructure items
<b>20 years<sup>a</sup></b>	Cycle of generations for human beings: (Veterans, 1922-1943); (Baby Boomers, 1943-1960); (Generation Xs (1960-1980); The Nexters (1980-2000)) Long enough to observe the economics and social impact of strategic R&D activities, e.g. the identification of CFCs scientifically and the sign of the international contract to take precautionary measures (1974-1990)
<b>50 years</b>	Incorporates some major concerns of a technologically advanced culture Culturally significant period to understand trends and change processes Enough to judge the impacts and implications of existing and new technologies
<b>100 years</b>	Boundary of a single lifetime Long cycles can be distinguished The rise and fall of regions, industries and ecosystems Theories and history and futures begin to flourish
<b>200 years</b>	Ideal timeframe for cultures in transition A time with which generations are linked Enough to develop intergenerational biography and dialogue The rise and fall of cultures, empires and entire ecosystems Macro view of history; the panorama of the centuries
<b>Notes:</b> <sup>a</sup>	not included in the original work of Slaughter (1996a, b, c)
<b>Source:</b>	Based and extended on the work Slaughter (1996a, b, c)

Carrying on forward from the frontiers of operative management of three years, the next level is the strategic management. Here, the upper boundary was set by taking the average of five years – the most cited time-frame for strategic planning – and ten years, which is long enough to provide insight into dynamic processes, as in Table I above. The average seven-and-a-half years separated the strategic and normative levels. This time-frame could also be thought of as a period long enough to cover the delays which should be added on top of the five years of strategic plans.

According to the above definition, the normative level covers a time-span of eight to 30 years. If the normative level is considered to be the policy level then a number of examples could be given where this time-frame is mentioned for the policy analysis. Niwa and Tomizawa (1999) argue that a science and technology development cycle which has a trajectory as an S-shaped curve with four phases, manufacturing production, technology development, scientific discovery, and scientific infrastructure, explains the Japanese science and technology activities since World War II. According to Niwa and Tomizawa (1999) there are five different periods for each phase. They have found that each

period lasts at least for ten years and at most for 30 years. Linstone (2001) analyses each long wave within 25 years with two cycles, e.g. upswing with recovery-prosperity and downswing with recession-depression.

#### **Claritas-unitas-integrates-consonante of IMM**

Niiniluoto (2001) clarifies the nature of futures studies with the distinction between descriptive science and design science. While doing this, Niiniluoto (2001) mentions that there has been a debate about whether future studies or foresight is a science – scientia (as a form of knowledge) in Latin, or an art – ars in Latin (as a form of skill), or technology – techne in Greek. Niiniluoto (2001) suggests that future studies is not a knowledge-seeking activity but rather a form of social technology – here art. He argues that future studies is a design science which does not tell how things are but how they ought to be and thereby attempts to help the rational planning of our future.

Joyce (1916) described that any product should incorporate three very important features such that it becomes an art: claritas-unitas-integrates. Coates (2001) also mentions clarity, i.e. claritas, consistency and integrity, i.e. integrates, as the virtues which should be admired and

practiced by university professors. Öner (2001) points out that “consonante” could be added to framework of Joyce (1916). Hence the framework becomes claritas-unitas-integrates-consonante.

The discussion of Bleicher (1991) about the vertical and horizontal integration among the levels and elements of management represent only one feature of the above-mentioned approach, which is integrates. Claritas requires that each field in IMM should be clearly defined without ambiguous statement. Unitas requires that all fields should produce a united picture where each field preserves its unity. The feature consonante means the harmony created between all fields such that these do not work against each other.

The research note of Elias and Dees (1997) is an example of the consonante feature of normative level of management. They discuss the normative foundations of business, based on two dimensions: objectives and constraints on business behaviour, which are very similar to the IMM elements “goals” and “behaviour”. In fact, “goal” is a very vague concept. The word “objective” is more suitable for this purpose since objectives – also due to the tradition of operations research – have to be quantified and bounded by time. The only missing element is “structure” of IMM, which is actually discussed at the end of the note under structure of the market, including legal institutions, monitoring process of unethical conduct, etc.

Elias and Dees (1997) point out that although it is very difficult to select the ideal normative goals and normative constraints, managers should combine these constraints with business performance such that they support each other. The structure of the market is very important in terms of its legal institutions because these may enforce or diminish the performance of the business. It is also mentioned that managers who do not follow high ethical standards are sometimes dismissed as being short-sighted. The authors favour maximization of profit as the normative goal, ethical and moral standards as the normative behaviour and efficient legal institutions as the normative structure.

### **Knowledge triangle for KPSO**

Major and Cordey-Hayes (2000) extended the work of Slaughter (1995) and Horton (1999) such that six features are included in the hierarchy of knowledge. However, their two-dimensional framework has one redundant dimension, i.e. the dimension which has abstract and concrete as two extremes. The other dimension lacks a normative level of management, whereas the work of ASTPP (1999) does not mention both normative and operative levels of management.

From these observations we developed the “knowledge triangle” which incorporated both the hierarchy of Major and Cordey-Hayes (2000), the levels of integrated management model, and the three necessary competencies, i.e. participation, creativity and expertise of Faucheux and Hue

(2001), as seen in Figure 4. Idier (2000) mentioned two of these competencies, i.e. creativity and expertise.

According to this triangle framework, operative actions create data which should be collected and transformed into information by expertise. The collation and summarization of information results in strategic knowledge, and creativity helps in translating that knowledge into understanding. The normative level of management is articulated when the understanding is assimilated to wisdom. Wisdom is transferred to action if and only if participation is in place such that actions become an issue of operative management and are widely implemented.

The triangle framework also carries similarities to the Greek triangle which Godet (2001) puts forward. In this triangle, the three features are related to each other and strengthen each other while thinking about and creating the future:

- (1) action, i.e. strategic will;
- (2) anticipation, i.e. prospective thought; and
- (3) appropriation, i.e. collective mobilization.

Expertise works as appropriation which forces collective mobilization. Creativity is not possible without prospective thought of anticipation. Participation leads to action via strategic will.

Another feature of the knowledge triangle is its inherent capability to show how the three competencies should be nurtured and developed within the levels of management of IMM. This is determined by the side of the triangle opposite to the corner. Creativity is an operative ability. Expertise should be developed over the long term since it is a normative ability. Participation 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.

## **The concept of the integrated foresight management (IFM) model**

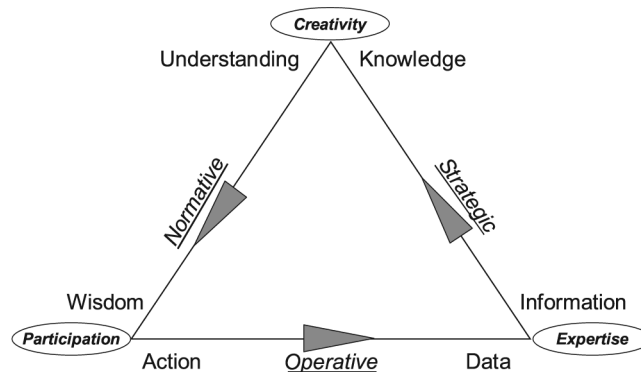
### **The development of IFM**

The successful management of foresight exercises depends on the understanding of foresight. In the 1990s, the debate about foresight as a concept intensified. However, the understanding of foresight has been dominated by different levels of management in different studies. For some, foresight was conceived only as a strategic exercise, while for others foresight was only a normative exercise. The results of the foresight exercises, and especially the outputs of Delphi studies, with events which could be realized in one to three years of time, also reflect the operative nature of foresight. Some authors also expressed the strategic and operative nature of foresight without mentioning the normative nature.

On the other hand, each national or regional exercise tried to focus on a list of sectors without considering the project nature of the foresight exercise. This focus resulted in exercises



**Figure 4 — Knowledge triangle**



with a bias towards only technology or system-related studies. Although the second generation is said to have also the people or behaviour focus, none of the studies exhibit an integrated scheme. Knowledge was an element which was discovered recently in the UK studies (Rappert, 1999).

The theoretical and practical issues discussed above increased the need for an integrated scheme. Here, IMM provides all aspects with its level, e.g. normative, strategic and operative, and its elements, e.g. structure, goals and behaviour, although there is this problem of vagueness concerning “goals” as described in the previous section. Besides, one can set goals for every field of IMM and define even more specific goals. The “structure” of IMM has the same meaning with organisation. The “behaviour” of IMM is nothing but the people category of KPSO. In the case of “goals” we are going to use “system” since system means the products and services to be generated, and therefore supports the other two pillars.

K is the fourth element of KPSO which should be analysed according to the triangular model given in the previous sections which combines the strength of the work carried out so far with the levels of IMM.

The whole discussion in previous sections results in IFM with the main structure as listed below:

- The modified IMM with defined time horizon.
- The knowledge triangle.
- The claritas-unitas-integrates-consonante principle.

#### Literature review according to the IFM model

In order to apply the IFM model and to understand the nature of comparative national foresight studies done so far, an assessment was carried out based on the results in the previous chapter. Table II displays the features of each comparative study and their authors on the IFM model.

There are two features which have not been shown on this model. The first one is the time horizon aspect very extensively discussed by Schultz (1997) for the first time.

The second one is the level of foresight exercises defined by Martin and Irvine (1989), i.e. macro, meso and micro level. The distribution of these on the levels are as follows: macro to normative, meso to strategic and micro to operative level.

Table II distinguishes the focus of the comparative national foresight. It is evident from the results that the most focussed element was system and the most focussed level was normative management. The fact that the one of the two fields with the highest number of features is the field of “normative systems” provides further support for this.

Among the levels of management, operative and strategic levels follow normative level with 12 and nine features respectively. The difference between normative and the remaining two levels shows a strong emphasis on the normative level while comparing national foresight exercises. Although there has been a significant focus on the strategy in the “foresight” literature, the comparative studies disregarded strategic management level which has only half of the normative level features. It is also observed that the total number of features of strategic and operative management levels almost reach and pass normative level with a slight difference of three features.

Among the elements of management, the analysis reveals that system-related features led the previous comparisons. System-related led with 16 features and organization and people follow with 11 features each. There are two fields with the least number of features which are on the strategic level with organisation and people elements. Compared with the top two fields which are on the normative level, there is no doubt that an improvement is needed within this framework towards defining and adding missing features.

The analysis of the features according to their publishing dates reveals also another important aspect. Most of the normative elements have been discussed since 1989, meaning a time interval of 12 years ending with 2001. On the

**Table II — Review of the features of comparative national foresight studies according to IFM**

	<b>Knowledge</b> <b>Anticipatory intelligence (Martin and Irvine, 1989)</b> <b>Knowledge dissemination (Blackman et al., 1999)</b> <b>Focus on socially robust knowledge (Jorgensen, 2001)</b> <b>Education (Gavigan and Scapolo, 1999)</b>		
Organization 11	System 16	People 11	
<b>Normative</b> <b>18</b>	<b>6</b> Characteristics of the organization (Martin and Irvine, 1989)  Balance between various "intrinsic tensions" (Martin and Irvine, 1989) Scope (Georghiou, 1996)  Technoeconomic vs. socioeconomic approach (Gavigan and Scapolo, 1999)  Foresight becomes a part of routine decision making (Glenn et al., 2001) Involvement of government in foresight (Glenn et al., 2001)	<b>5</b> Connection of policy to practitioners (Georghiou, 1996)  Provident vs. negotiation state (Webster, 1999) Creating a forward thinking culture (Blackman et al., 1999) Matching technological changes with acceptable directions for society (Gavigan et al., 2001) Agenda setting with wide range of interests (Jorgensen, 2001)	
<b>Strategic</b> <b>9</b>	<b>2</b> Number of sub-areas (Schultz, 1997)  Central/decentral (Gavigan and Scapolo, 1999)	<b>5</b> Form network of innovators (Georghiou, 1996) network formation (Blackman et al., 1999)  International comparison (Gavigan and Scapolo, 1999) Determining priorities (Martin and Johnston, 1999) Setting priorities (Blackman et al., 1999) Early warning system for decision makers (Glenn et al., 2001)	
<b>Operative</b> <b>12</b>	<b>3</b> Number of topic statements (Schultz, 1997) Delphi (Martin and Johnston, 1999) Panel (Tegart, 2000)	<b>4</b> Stimulating debate (Georghiou, 1996)  Prediction/prescription (Northcott, 1996) Quantification via models (Northcott, 1996) Specific follow-up actions (Gavigan and Scapolo, 1999) Link the process with the desired outcome (Jewell et al., 2000)	

operative level, the discussion of the people element started in 1989. However, system entered in 1996 and organisation in 1997. The strategic features have been discussed very lately since 1996 for all elements. Based on these, we can state that while normative features have been a major discussion area since 1989, strategy has become an issue in 1996.

**Completion of IFM with missing features**

As mentioned in the previous section, there is a biased distribution of features according to the current literature about comparison of national foresight studies. Critical areas

are strategic management level and the elements of people and organisation. In order to add the missing features, the basic definition of the integrated management model was reviewed. Since the maximum number of features per field was six in the previous section, the target for the completion step for the total number of fields for each area was also defined as six.

While adding the missing features, the following principle was followed. Some features of the IMM are not relevant for IFM since they have to be defined case by case. In the case of the strategic/systems field, whether the performance of

resources are going to be specialized or generalist depends on the specific area, technology or solution. In another case concerning the strategic/people field, the place of behaviour development is not a feature for comparison of national foresight programmes since the competition among nations occurs globally and the development of mobile

communication makes the idea of a fixed place irrelevant. The final IFM model is presented in Table III.

### Conclusion

The IFM model reveals a comprehensive framework with which it is possible to assess any foresight exercise by

**Table III — Complete IFM structure for comparison of national foresight studies**

	<b>Knowledge</b>		
	<b>Anticipatory intelligence (Martin and Irvine, 1989)</b>		
	<b>Knowledge dissemination (Blackman et al., 1999)</b>		
	<b>Focus on socially robust knowledge (Jorgensen, 2001)</b>		
	<b>Education (Gavigan and Scapolo, 1999)</b>		
<b>Organization</b>	<b>System</b>	<b>People</b>	
<b>18</b>	<b>18</b>	<b>18</b>	
<b>Normative</b> <b>18</b>	<b>6</b> Characteristics of the organization (Martin and Irvine, 1989)  Balance between various "intrinsic tensions" (Martin and Irvine, 1989) Scope (Georghiou, 1996)  Technoeconomic vs. socioeconomic approach (Gavigan and Scapolo, 1999)  Foresight becomes a part of routine decision making (Glenn et al., 2001) Involvement of government in foresight (Glenn et al., 2001)	<b>6</b> Direction setting (Martin and Irvine, 1989), vision building (Blackman et al., 1999)  Advocacy (Martin and Irvine, 1989)  Direct link to science and technology policy (Gavigan and Scapolo, 1999) Plan for uncertainty (Jewell et al., 2000)  Enrich policy making process (Gavigan, Scapolo, 2001) Focus on risk management (Jorgensen, 2001)	<b>6</b> Connection of policy to practitioners (Georghiou, 1996)  Provident vs. negotiation state (Webster, 1999) Creating a forward thinking culture (Blackman et al., 1999) Matching technological changes with acceptable directions for society (Gavigan et al., 2001) Agenda setting with wide range of interests (Jorgensen, 2001) Cultural leverage (collective us/individual heros)
<b>Strategic</b> <b>18</b>	<b>6</b> Number of sub-areas (Schultz, 1997)  Central/decentral (Gavigan and Scapolo, 1999) Reference points (formal rules/symbols)  Extent of rules (single rules, efficiency oriented/framework rules, effectivity oriented) Hierarchy (high/low)  Organizational development (inwards, towards efficiency/outwards, towards effectiveness)	<b>6</b> Form network of innovators (Georghiou, 1996), network formation (Blackman et al., 1999)  International comparison (Gavigan and Scapolo, 1999) Determining priorities (Johnston and Martin, 1999) Setting priorities (Blackman et al., 1999)  Early warning system for decision makers (Glenn et al., 2001)  Deployment of resources (fixed/flexible)	<b>6</b> Access to expert views (Georghiou, 1996)  Involve all stakeholders (Jewell et al., 2000) Focus of behaviour development (individual/team) Desired management behaviour (risk-averse/entrepreneurial)  Authority development (institutional, hierarchy based/communication, specialist based) Type of desired learning behaviour (vertical, horizontal)
<b>Operative</b> <b>18</b>	<b>6</b> Number of topic statements (Schultz, 1997) Delphi (Johnston and Martin, 1999) Panel (Tegart, 2000)  Representation techniques  Implementation methodologies  Organisational development	<b>6</b> Stimulating debate (Georghiou, 1996)  Prediction/prescription (Northcott, 1996) Quantification via models (Northcott, 1996) Specific follow-up actions (Gavigan and Scapolo, 1999)  Link the process with the desired outcome (Jewell et al., 2000)  Annual budgets	<b>6</b> Consensus generation (Martin and Irvine, 1989) Number of respondents (Schultz, 1997) Informal, semiformal (Martin and Johnston, 1999) Scenarios (Martin and Johnston, 1999)  Behaviour diagnosis  Motivation techniques

focusing on the most important features of management of the future, i.e. the levels and elements of management. By clearly distinguishing the levels of management, i.e. policy, strategy and operations, and the elements of management, i.e. knowledge, people, system and organisation, and also integrating these via the claritas-unitas-integrates-consonante framework, the IFM enables any practitioner a holistic view.

The benefits of such a model could be observed in three main implementation areas regarding foresight:

- (1) The implementation of any foresight study could be managed by using this model as checklist for a methodological approach such that all features of a foresight study are covered in a balanced approach.
- (2) The assessment of the national foresight studies by country with IFM could clearly distinguish the performances and nature of each study. Alsan (2003) found out that the framework was very effective in the assessment of eight national foresight studies which have different characters and are in different levels of economic development.
- (3) The IFM also could also enable the definition of generations of foresight studies under the evolution of foresight studies. By looking at the missing features in each generation, an action plan can be developed for each generation in order to develop the infrastructure for the next generation of foresight.

Hence, we can conclude that IFM would be an eye-opener for the foresight theorists and practitioners worldwide by shedding light on the most frequently discussed topics in the foresight literature and application. ■

#### References

- Advanced Science and Technology Policy Planning Network (ASTPPN) (1999), *Improving Distributed Intelligence in Complex Innovation Systems (ASTPPN)* Karlsruhe.
- Alsan, A. (2003), "Comparative national foresight studies and a methodology proposal for Turkey 2023", unpublished PhD thesis, Institute for Graduate Studies in Pure and Applied Sciences.
- Andersen, E.S., Grude, K.V. and Haug T. (1995), *Goal Directed Project Management*, Kogan Page, London.
- Barker, D. and Smith, D.J.H. (1995), "Technology foresight using roadmaps", *Long Range Planning*, Vol. 28, pp. 21-8.
- Bell, W. (1998), "Foresight, moral judgement and certitude", *Futures*, Vol. 30 pp. 91-5.
- Blackman, C., Scapolo, F., Fleissner, P. and Moncada-Paterno-Castello, P. (1999), "With the benefit of foresight a roadmap for research, technology and development", *Foresight*, Vol. 1, pp. 491-3.
- Bleicher, K. (1991), *Das Konzept Integriertes Management*, Campus, Frankfurt/New York, NY.
- Coates, J.F. (1985), "Foresight in federal government policymaking", *Futures Research Quarterly*, Vol. 1, pp. 29-53.
- Coates, J.F. (2001), "Preface", in Godet, M. (Ed.), *Creating Futures: Scenario Planning as a Strategic Management Tool*, Economica, London.
- Davis, D.D. (1986), "The uniqueness of human learning", *Med. Hypotheses*, Vol. 21, pp. 153-64.
- Deutsch, K.W. (1963), *The Nerves of Government*, Free Press, New York, NY.
- Elias, J. and Dees, J.G. (1997), "The normative foundations of business", Research note, June, Harvard Business School, Cambridge, MA.
- Faucheux, S. and Hue, H. (2001), "From irreversibility to participation: towards a participatory foresight for the governance of collective environmental risks", *Journal of Hazardous Materials*, Vol. 86, pp. 223-43.
- Gavigan, J.P. and Scapolo, F. (1990), "Matching methods to the mission: a comparison of national foresight exercises", *Foresight*, Vol. 1, pp. 495-517.
- Gavigan, J.P. and Scapolo, F. (2001), "Foresight and the long-term view for regional development", *The IPTS Report*, Vol. 56, pp. 19-29.
- Gavigan, J., Zappacosta, M., Ducatel, K., Scapolo, F. and di Pietrogiacomo, P. (2001), "Challenges and priorities for European research: a foresight review", *Foresight*, Vol. 3, pp. 261-71.
- Georghiou, L. (1996), "The UK technology foresight programme", *Futures*, Vol. 28, pp. 359-77.
- Glenn, J.C., Dator, J. and Gordon, T.J. (2001), "Futures research and decision making: examples and reflections", *Foresight*, Vol. 3, pp. 177-89.
- Godet, M. (2001), *Creating Futures: Scenario Planning as a Strategic Management Tool*, Economica, London.
- Graf, H.G. (1999), *Prognosen und Szenarien in der Wirtschaftspraxis*, Verlag Neue Zürcher Zeitung, Carl Hanser Verlag, Munich.
- Horton, A. (1999), "Forefront: a simple guide to successful foresight", *Foresight*, Vol. 1, pp. 5-9.
- Ilder, D. (2000), "Science fiction and technology scenarios: comparing Asimov's robots and Gibson's cyberspace", *Technology in Society*, Vol. 22, pp. 255-72.
- Irvine, J.B. and Martin, R. (1984), *Foresight in Science: Picking the Winners*, Pinter Publishers, London.
- Jewell, T., Uchupalanan, K. and Sripaipan, C. (2000), "Authority, legitimacy and credibility of foresight studies", paper presented at International Conference on Technology Foresight, Tokyo, March.
- Jørgensen, B.H. (2001), *Making Sense of Technology Foresight in Denmark*, Riso National Laboratory, Denmark, July.
- Joyce, J. (1916), *A Portrait of the Artist as a Young Man*, Penguin Books, Harmondsworth, pp. 211-13.
- Kozłowski, J. (2001), "Adaptation of foresight exercises in central and eastern European countries", Regional Conference on Technology Foresight for Central and Eastern Europe and the Newly Independent States, UNIDO, Vienna, 5 April.
- Linstone, H. (2001), "Corporate planning, forecasting, and the long wave", in PICMET' 01, Proceedings Portland International

- Conference on Management of Engineering and Technology, Portland, OR, 25-29 July.
- McDermott, W.B. (1996), "Foresight is an illusion", *Long Range Planning*, Vol. 29, pp. 190-4.
- Major, E. and Cordey-Hayes, M. (2000), "Knowledge translation: a new perspective on knowledge transfer and foresight", *Foresight*, Vol. 2 pp. 411-23.
- Martin, B.R. and Irvine, J. (1989), *Research Foresight: Priority-Setting in Science*, Pinter Publishers, London and New York, NY.
- Martin, B.R. and Johnston, R. (1999), "Technology foresight for wiring up the National Innovation System", *Technological Forecasting and Social Change*, special Issue, Vol. 60, pp. 37-54.
- Niiniluoto, I. (2001), "Futures studies: science or art", *Futures*, Vol. 33, pp. 371-7.
- Niwa, F. and Tomizawa, H. (1999), "The Japanese S&T development cycle and related policy", in PICMET' 99, Proceedings Portland International Conference on Management of Engineering and Technology, Portland, OR, 25-29 July.
- Northcott, J. (1996), "Mapping the future for countries", *Long Range Planning*, Vol. 29, pp. 203-7.
- Öner, M.A. (2001), personal communication.
- Öner, M.A. and Başoğlu, N. (2000), "Knowledge, people, system and organisation framework", research note, Manufacturing and Technology Strategies Research Group, Istanbul.
- Rappert, B. (1999), "Rationalising the future? Foresight in science and technology policy co-ordination", *Futures*, Vol. 31, pp. 527-45.
- Robinson, G.W. (1996), "Technology foresight – the future for IT", *Long Range Planning*, Vol. 29, pp. 232-8.
- Ruff, F. (2001), "Society and technology foresight for corporate strategy", Regional Conference on Technology Foresight for Central and Eastern Europe and the Newly Independent States, UNIDO, Vienna, 5 April.
- Schaffer, R.H. (1988), *The Breakthrough Strategy – Using Short-term Successes to Build the High Performance Organization*, Harper Business, New York, NY.
- Schultz, W. (1997), "NHS: Systemic approaches to foresight", European Symposium "Health Futures: Tools to Create Tomorrow's Health System", King's Fund, London, 10-11 November.
- Slaughter, R.A. (1995), *The Foresight Principle: Cultural Recovery in the 21st Century*, Adamantine Press, London.
- Slaughter R.A. (1996a), "Futures studies: the path from individual to social capacity", *Futures*, Vol. 28, pp. 751-62.
- Slaughter, R.A. (1996b), "Foresight beyond strategy: social initiatives by business and government", *Long Range Planning*, Vol. 29, pp. 156-63.
- Slaughter, R.A. (1996c), "Long-term thinking and the politics of reconceptualization", *Futures*, Vol. 28, pp. 75-86.
- Tegart, W.J. (2000), "The current state of foresight studies around the world", The Australian Academy of Technological Sciences and Engineering, available at: [www.atse.org.au/publications/focus/focus-tegart4.htm](http://www.atse.org.au/publications/focus/focus-tegart4.htm) (accessed October 2001).
- Ulrich, H. (1984), *Management*, Verlag Paul Haupt, Bern/Stuttgart.
- Webster, A. (1999), "Technologies in transition, policies in transition: foresight in the risk society", *Technovation*, Vol. 19, pp. 413-21.