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# Comparison of national foresight studies by integrated foresight management model

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## Abstract

National foresight studies have become a common tool in the last decade of the 20th century. Despite the fact that a lot of comparative studies have been carried out to compare these projects, none of them has been capturing all dimensions and elements of foresight since a comprehensive definition of foresight was missing. The integrated foresight management model is an attempt to provide an integrated and holistic view about the impact of foresight on the management of the future. In this article, a checklist is proposed based on the integrated foresight management model to compare eight national foresight studies. Based on the results, the discussion about “generations” of foresight is revisited and a new definition of “generations” is proposed. The conceptual framework which is the integrated foresight management model and the derived checklist can be developed in the future by expanding the amount of data available for analysis and the number of independent experts to make this comparison.

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## 1. Introduction

National foresight studies have become a common tool in the last decade of the 20th century. There are numerous studies about the results of these projects. Based on these experiences, several authors have tried to propose institutional frameworks for foresight. Slaughter and Garret [24] described the major characteristics of institutions of foresight. Keenan [16] evaluated the implementation of the UK Technology Foresight Programme. Despite the fact that a lot of comparative

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studies have been carried out to compare these projects, none of them has been capturing all dimensions and elements of foresight since a comprehensive definition of foresight was missing.

These comparisons are very important due to their future contribution to the understanding of the process nature of the national foresight studies. The integrated foresight management model (IFM) is an attempt to provide an integrated and holistic approach about the impact of foresight which has been defined as a core competence by Major et al. [17] on the management of the future. In this paper, the IFM is used as a checklist to compare eight national foresight studies and the results of this comparison are used to revisit the discussion about “generations” of foresight.

Section 2 reviews comparative studies of national foresight studies and categorizes them by using IFM. Section 3 explains how to use IFM as a comparison checklist. In Section 4, the countries are selected based on their stage of economic development. Section 5 discusses the results of the comparison by IFM and revisits the definition of “generations” of foresight. Section 6 concludes by presenting the proposed characteristics of a fourth generation national foresight study as a causal map which is developed with the help of IFM.

## 2. Literature review

The integrated foresight management model by Alsan and Oner [1] is primarily based on the integrated management model (IMM) of Ulrich [26] and Bleicher [5] and the Knowledge–People–System–Organisation (KPSO) framework of Oner and Basoglu [21]. Bleicher [5] of St. Gallen University developed the “St. Gallen Management Concept” of Ulrich [26] and named it as “The Concept of Integrated Management”. Bleicher [5] builds this concept based on the functions of management which are defined as forming, steering and development [26].

The concept of integrated management (Fig. 1) is characterised by a two dimensional structure of the problem areas of management: the impact of time (vertical view) and constituting elements (horizontal view). On the vertical view, different management levels are defined according to the time dimension which require 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, maintaining and utilisation of success potentials. The operative management is responsible for the implementation of normative and strategic aims.

On the horizontal 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 determined 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.

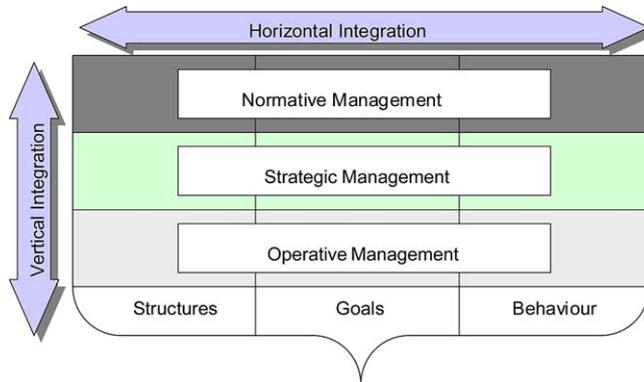


Fig. 1. The concept of integrated management model of Bleicher [5].

IFM has three levels and three elements. The levels stem from the IMM, i.e. normative, strategic and operational levels. The idea of the elements stem from the IMM but have been replaced with the KPSO. The literature review of comparative national foresight studies has been carried out by using IFM as shown in Table 1, which displays the original features of each comparative study and their authors.

As mentioned by Johnston and Martin [14], conceptual frameworks are needed to analyse the foresight process. The results—as mentioned by Webster [27]—are dependent on the experts or panels responding to the study. Gavigan and Scapolo [6] revealed the tendency in the foresight communities that the foresight process should be continuously on-going. Hence, a conceptual framework for comparison should take care of this “process management concept”.

It is worth mentioning that the analysis of the features according to their publishing dates reveals an important aspect. Most of the normative elements have been discussed since 1989, regarding a time interval of 12 years ending with 2001. On the operational level, the discussion of people element started in 1989. System and organisation entered the discussion arena in 1996 and 1997, respectively. 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.

Table 1 also shows that there is a biased distribution of features coming from the literature survey across the fields of IFM. Alsan and Oner [1] carried out a detailed discussion of this analysis; however, the good news is that IFM really can cover the existing theory about comparative national foresight studies and provide a holistic conceptual basis due to the fact that there are some missing features to be defined specifically for IFM.

Apart from these comparative studies, in April–June 2000, Aslaner [2] conducted another comparison study of four national foresight studies, e.g. United Kingdom, Germany, New Zealand and Japan, by referring to their websites which were widely used in the 1990s. The KPSO framework was used for comparison by using

Table 1  
Review of the features of comparative national foresight studies according to IFM

Knowledge			
	Organisation 11	System 16	People 11
	Anticipatory intelligence [18]		
	Knowledge dissemination [4]		
	Focus on socially robust knowledge [15]		
	Education [6]		
Normative 18	6 Characteristics of the organisation [18] Balance between various “intrinsic tensions” [18] Scope [9] Technoeconomic vs. socio-economic approach [6] Foresight becomes a part of routine decision making [11] Involvement of government in foresight [11]	6 Direction setting [18], vision building [4] Advocacy [18] Direct link to science and technology policy [6] Plan for uncertainty [13] Enrich policy making process [7] Focus on risk management [15]	5 Connection of policy to practitioners [9] Provident vs. negotiation state [27] Creating a forward thinking culture [4] Matching technological changes with acceptable directions for society [8] Agenda setting with wide range of interests [15]
Strategic 9	2 Number of sub-areas [23] Central/decentral [6]	5 Form network of innovators [9], network formation [4] International comparison [6] Determining priorities [14] Setting priorities [4] Early warning system for decision makers [11]	2 Access to expert views [9] Involve all stakeholders [13]
Operative 12	3 Number of topic statements [23] Delphi [14] Panel [25]	5 Stimulating debate [9] Prediction/prescription [20] Quantification via models [20] Specific follow-up actions [6] Link the process with the desired outcome [13]	4 Consensus generation [18] Number of respondents [23] Informal, semiformal [14] Scenarios [14]

the 27 criteria of the ISO 9126 standard for software products [3]. As seen in Table 2, “System” element collected the highest number of points with a share of 70%. “People” element was also able to score higher than 50% with 58%. “Organisation” element scored the least with 25% with six points out of 24. Hence, the

Table 2  
Points of national foresight study websites (modified from Aslaner [2])

Element	Number of UK criteria		Germany	New Zealand	Japan	Score	Share in total
People	10	8	4	7	4	23/40	58%
System	11	10	10	6	5	31/44	70%
Organisation	6	1	2	2	1	6/24	25%
Score	19/27		16/27	15/27	10/27		
Share in total	70%		59%	56%	37%		

most critical results is the lack of focus on “organisation” element which includes both the way processes and participation are defined and the structure of the website. Participation is not especially promoted on most of the sites. Most of the sites are used as a one-way communication media—from the foresight organisation to the users but not the other way round.

If the leading country of each category is analysed UK clearly comes forward with its leadership in “people” and “system”. In “people”, New Zealand follows UK and in “system” Germany is equal to UK. Japan is the lagging country which suffers in all elements. Historical perspective reveals that the scores of Japan—the first country which exercised national foresight—were the starting point. Germany picked up the Japanese approach but focused on only “system” element. The national foresight studies of these countries could be evaluated as the *first generation* of foresight from website perspective. UK and New Zealand developed this approach further by focusing on “people” element while New Zealand could not excel in “system” element as expected. These two countries can be categorized as the *second generation* of foresight due to their focus on “people”. However, the overall lack in “organisation” element is observable in all countries.

### 3. IFM model as a comparison checklist

As mentioned in Section 2, the current literature review based on IFM revealed that there are some missing features in the IFM. “Knowledge” of KSPO was excluded in this comparison since it was inadequately discussed in IFM. In order to add the missing features, the basic definition of integrated management model was consulted. The proposed IFM model consists of 54 features. The following steps were realized in order to utilize IFM:

*Step 1—Reformulation of features into questions:* The features were reformulated as questions such that each feature could be assessed. Here, the questions were either derived from literature or suggested by the present work based on the basic approach of Martin and Irvine [18].

*Step 2—Grading methodology:* If a feature was observed it was graded as “1” for that particular study and as “0” if it was not observed or for that particular

study. For some questions there are two alternative answers and the grade is chosen according to the observed answer. The resulting table of IFM with features as questions to be asked is given in [Table 3](#).

*Step 3—Judgement:* For each nation, the gradings were carried by three independent experts who had access to the related sources.

*Step 4—Consolidation and reporting:* Gradings were collected and reported as radar diagrams in [Fig. 4](#) such that comparison could be made.

The grades of IFM features according to their availability by “observing” criteria is given together with total number of observed features for each segment which are then accumulated on each level and element of management. For each nation, a total score of “observed” feature was also calculated which was also translated into a percentage grade as in [Table 5](#).

This methodology enables a quantitative comparison of the national foresight studies based on the qualitative assessment of the observations made during the research. A major advantage of this approach is that one can directly compare the selected national foresight studies by looking at their total scores and “percentage” grades and also discuss the elements and levels of management on international and national levels. The availability of quantitative measurement enhances the description of the national foresight studies according to the IFM model.

#### **4. Selection of the countries for comparison**

In the literature concerning comparing national foresight studies, countries were selected according to the availability of data and information and historical background. However, there was no criteria applied concerning the position of the national economies with respect to their level of development apart from the work of Gavigan and Scapolo [\[7\]](#) who used a relative scale of techno-economic development, the indicators of which have not been indicated.

Graf [\[12\]](#) argues that there are different theories and cycles which are related to different levels of management. The economic situation and cycles of a country could be categorized under operative level. The growth theories of economy are more related with the strategic level. The evolutionary theories of economy represent the discussion basis for the normative level of management. The evolutionary theories also evolved from “deterministic” or “closed” theories of Marx [\[19\]](#) who argues that nations “have to” enter the communistic phase after the capitalism to more “open” theories such as of Rostow [\[22\]](#) whose ideas are based on the idea that the future is not deterministic but depends on the decision, will and action of the society in selecting among the alternative futures.

As mentioned by Graf [\[12\]](#), Rostow [\[22\]](#) focuses deliberately on the era after the beginning of the industrial revolution and shows that nations could be positioned in five different phases according to the time as shown in [Fig. 2](#). The “post-industrial” society of Rostow [\[22\]](#) which was renamed as “knowledge” society since “post-industrial” is not a clear description to explain this phase. None of these

Table 3  
Proposed checklist questions for features of IFM

	Organisation 18	System 18	People 18
Normative 18	6	6	6
	Are the characteristics of the organisation mentioned or observed ?	Is direction setting/vision building observed?	Is there a connection of policy to practitioners?
	Is there a balance between various “intrinsic tensions”?	Is advocacy observed?	Which role does the state play? (provident = 0; negotiation = 1)
	Is the scope of the study widely defined?	Is there a direct link to science and technology policy ?	Does the study create a forward thinking culture?
	Does the study implement a socioeconomic approach?	Does the study plan for uncertainty?	Does the study match technological changes with acceptable directions for society?
	Does foresight becomes a part of routine decision making after the study?	Does the study enrich policy making process?	Does the study set the agenda with wide range of interests?
	Is the government involved in foresight?	Does the study focus on risk management?	What is the focus of cultural leverage? (collective us = 0; individual heroes = 1)
Strategic 18	6	6	6
	Is the number of sub-areas clearly mentioned?	Is the formation of innovator networks a goal of the study?	Does the study have access to expert views?
	Is the study decentrally organised?	Has international comparison been carried out?	Does the study involve all stakeholders ?
	Are there formal reference points?	Is determination of the priorities a goal of the study?	What is the focus of behaviour development? (individual = 0; team = 1)
	What is the extent of rules (single rules, efficiency oriented = 1; framework rules, effectivity oriented = 0)	Is setting priorities a goal of the study?	What is the desired management behaviour? (risk-averse = 0; entrepreneurial = 1)
	Is the hierarchy low?	Is the study used as an early warning system for decision makers ?	How is the authority development? (institutional, hierarchy based = 0; communication, specialist based = 1)
How is the approach towards organisational development? (inwards, towards efficiency = 0; outwards, towards effectiveness = 1)	How is the deployment of resources? (fixed = 1; flexible = 0)	What is the type of desired learning behaviour? (vertical = 0; horizontal = 1)	

(continued on next page)

Table 3 (continued)

	Organisation 18	System 18	People 18
Operative 18	6	6	6
	Is the number of topic statements clearly mentioned?	Is stimulation of debate a goal of the study?	Has anything about consensus generation been mentioned in the study?
	Is Delphi used?	Is prediction/prescription a goal of the study?	Is the number of respondents given ?
	Is the panel structure used?	Is quantification via models a goal of the study?	Does the study employ both informal, semiformal behaviour?
	Is any of representation techniques used?	Have there been specific follow-up actions?	Are people active in the scenario building process ?
	Is any of implementation methodologies used?	Is there a link between the process and the desired outcome?	Are people using behaviour diagnosis techniques?
	Is there an operative approach for organisational development?	Is there a relation of the results with the annual budgets of the national organisations?	Does the study use motivation techniques?

phases is an end-phase and the evolution depends on the social and economical priorities of that society. Rostow [22] also points out that nations follow two different curves. These paths are S-shaped curves and have different requirements. The upper S-curve could be observed if that nation continuously thinks about alternative development paths and develops its alternative scenarios. Otherwise, the lower

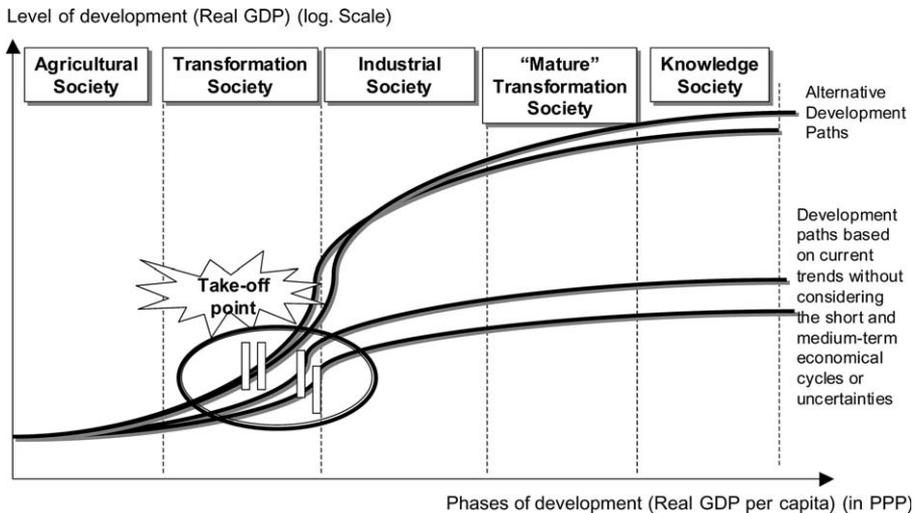


Fig. 2. S-curve of economic development (adapted from Graf [12]).

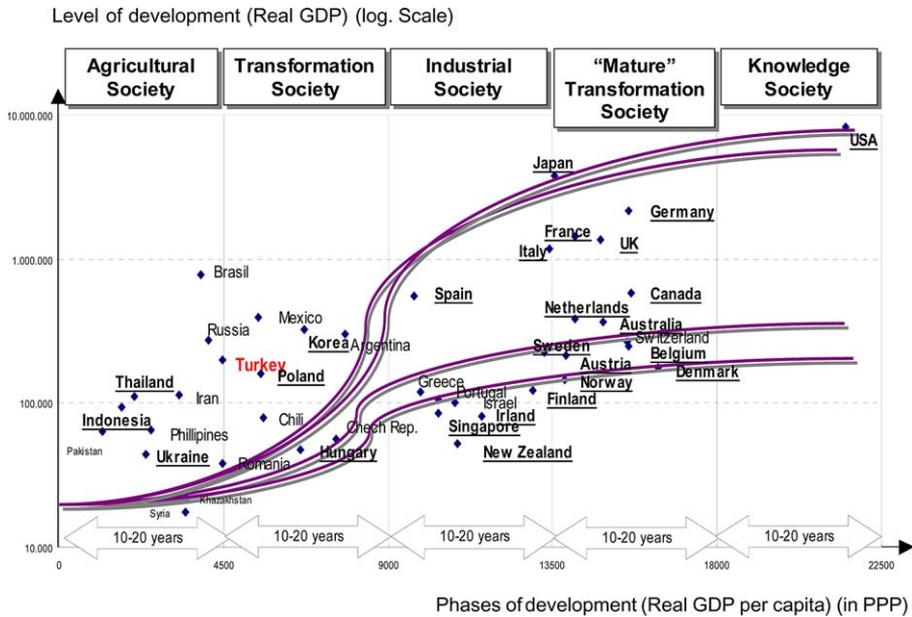


Fig. 3. Application of data to the S-curve of economic development model for 1998.

S-curve is observed where these nations do not consider uncertainties and the economic cycles and base their development on current trends.

In order to carry out the selection, real data obtained from the World Bank was fed into the model and a map of countries was created in order to position them on the curves as in Fig. 3. The purchasing power parity was used on the x-axis as unit such that the relation between both axes could be diminished which otherwise becomes dependent on the total population.

The positions of the countries match the theory since there are a few nations who are on the upper S-curve, a lot of nations which are on the lower S-curve, a small group of nations between the two S-curves. Additionally all the nations with national foresight studies have been underlined such that a relation between level of economic development and national foresight could be drawn. Turkey was positioned on the boundary between agricultural and transformation society. Taking this point as the starting point for selecting other nations, it could be claimed that there are two groups—“leading” countries which fall under “knowledge” and “mature transformation” societies, and “lagging” nations which fall under “industrial” and “transformation” societies.

Four countries were selected from each group and among each group a balanced number of countries were selected for each phase with only perception being the “knowledge society” since there was only one nation in this phase—the USA. Eight countries were selected as the sample group of this comparative study: USA, Japan, Germany, UK, Spain, New Zealand, Korea and Hungary as in Table 4.

Table 4  
Selected countries for comparison

Nation	Character	Level of development
USA	Leading	Knowledge society
Japan	Leading	Mature transformation society
Germany	Leading	Mature transformation society
UK	Leading	Mature transformation society
Spain	Lagging	Industrial society
New Zealand	Lagging	Industrial society
Korea	Lagging	Transformation society
Hungary	Lagging	Transformation society

Table 5  
Comparison results by levels and elements of IFM

	Levels of IFM			Elements of IFM			Total	Grade
	Normative	Strategic	Operative	People	System	Organisation		
<i>Leading nations</i>								
USA	15	16	14	15	15	15	45	83%
Japan	15	12	10	11	14	12	37	69%
Germany	14	10	9	10	14	9	33	61%
UK	15	13	11	13	14	12	39	72%
<i>Average</i>	<i>14.8</i>	<i>12.8</i>	<i>11.0</i>	<i>12.3</i>	<i>14.3</i>	<i>12.0</i>	<i>38.5</i>	
<i>Lagging nations</i>								
Spain	10	11	6	9	9	9	27	50%
New Zealand	14	12	12	14	13	11	38	70%
Korea	15	12	12	13	13	13	39	72%
Hungary	15	13	12	15	12	13	40	74%
<i>Average</i>	<i>13.5</i>	<i>12.0</i>	<i>10.5</i>	<i>12.8</i>	<i>11.8</i>	<i>11.5</i>	<i>36.0</i>	
<i>All nations</i>								
<i>Average</i>	<i>14.1</i>	<i>12.4</i>	<i>10.8</i>	<i>12.5</i>	<i>13.0</i>	<i>11.8</i>	<i>37.3</i>	

## 5. Discussion of the results

The results of the countries in Fig. 4 have been aggregated on the levels and elements of IFM. The total grades of each nation was also recalculated as a percentage grade as in Table 5 which is the share of total points in 54.

On average, for all national studies, the normative nature of foresight leads among levels with 14.1 points. The second level was strategic management with 12.4 points. The interesting observation is that operative level of management lacks focus on average with 10.8 points. This observation leads to the conclusion that foresight is still considered as a normative exercise, the integration with strategy is secondary. Operations are not aligned with normative and strategic decisions. This approach does not show different characteristics among leading and lagging nations. This might be due to the fact that the ones who are copying are doing the same mistakes as the so-called “first users”.

Table 6  
Selected countries for comparison

Generation	Grade interval (in%)	Countries
First generation	60–69	Japan, Germany
Second generation	70–79	UK, New Zealand, Korea, Hungary
Third generation	80–89	USA
Fourth generation	>90	Not available

When the elements are considered, on average system the focus was with 13.0 which means that the results were still considered as more important. This is especially observed in the leading countries where system reached 14.3 on average. People was the second element with 12.5 which is rather close to system. Organisation was the element with the least emphasis which is especially low for lagging countries. Lagging countries did not focus on organisational issues and development during their national studies.

Looking at the total score of each country it is clearly seen that the USA is the leading country with 83%. Spain is the country with the least grade of 50%. However, this might also be due to the lack of information about the Spanish national foresight study. Still, if the characters of the nations are disregarded, there is a pattern in the grades. It could be said that there are four generations for these studies as given in Table 6.

If the result of Spain is excluded due to the reasons mentioned above, the first generation includes countries such as Japan and Germany. Japan is the country which was the leader in the implementation of national foresight and Germany adapted its approach from Japan. The characteristics of the first generation is a focus on the normative level and system element which is actually what is observed on average.

The second generation including UK, New Zealand, Korea and Hungary were the followers in the implementation of national foresight. However, their studies were able to increase the focus on strategic and operative levels which are still not at the same level with normative level. On the elements side, the second generation focused more on the people element as seen in Table 5. In some countries such as New Zealand and Hungary, people element even scored higher. Here, the scores of elements are again not on satisfactory levels.

The third generation is only observed in the USA where most of the foresight methods were developed in the early 1950s and disseminated afterwards. All elements and levels of IFM are distributed in a balanced way. The only deficiency of the nation is the incompleteness of the scores. Each score is 17% behind the total score which could be attained if IFM is applied completely.

## 6. Conclusions

The assessment of the national foresight studies by country with IFM clearly distinguished the performances and nature of each study. The analysis underlines that

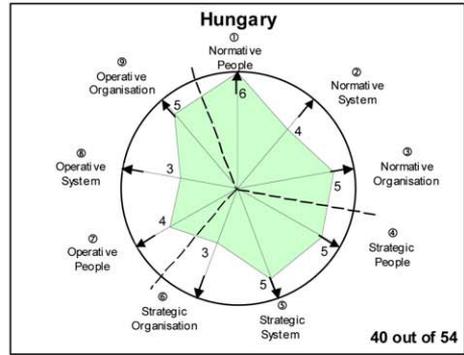
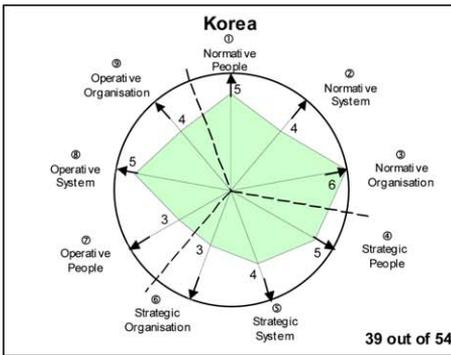
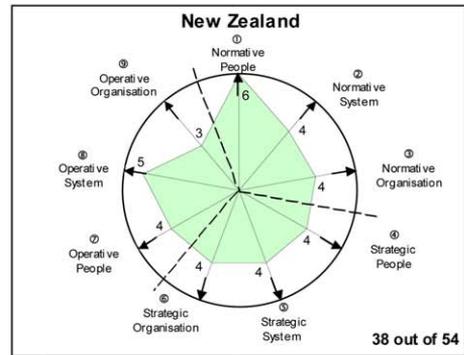
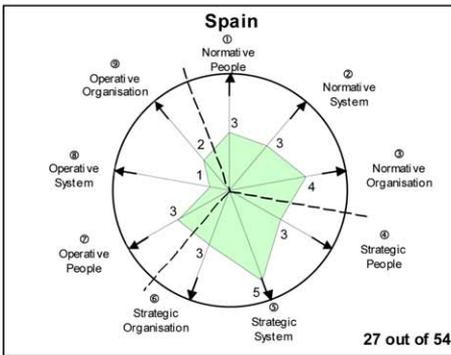
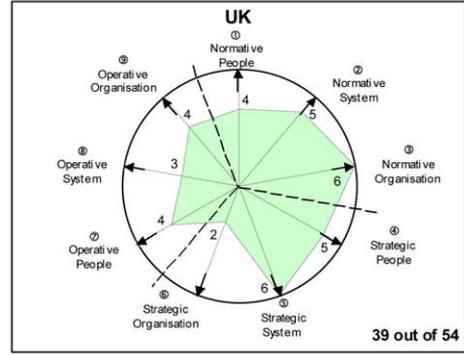
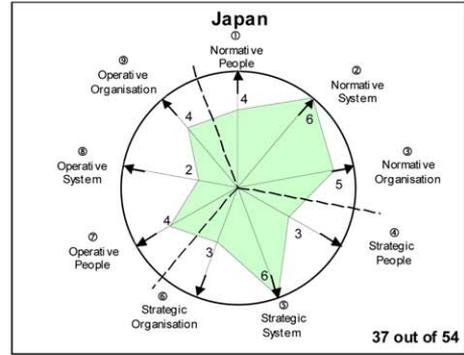
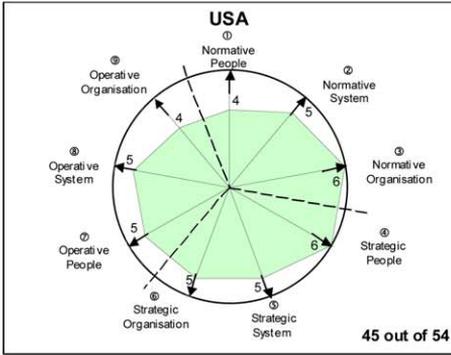


Fig. 4. Radar diagrams of selected national foresight studies.

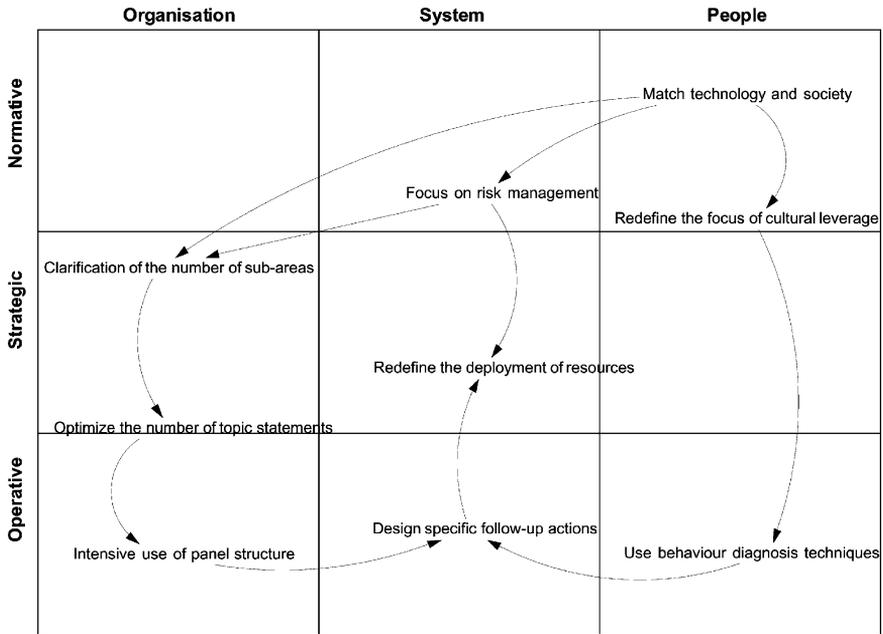


Fig. 5. Causal map of the proposed characteristics of the fourth generation.

although there is an example of the third generation of foresight study, it looks like this is not UK as Georghiou [10] claimed. The USA exhibits the characteristics of third generation due to its long history and penetration level of foresight tools.

The only generation which was not observed is the fourth generation of foresight. Looking at the missing features of the USA, we can generate an action plan in order to develop the infrastructure for the fourth generation foresight. Hence, the *fourth generation* requires the following characteristics which have a causal interrelationship as shown in Fig. 5.

It was also observed that some first and second generation countries, e.g. Japan and UK, have these characteristics such that an amalgamation of the first three generations could be established as the fourth generation.

This is the first application of the IFM model in the form of a checklist. The work to improve the model is continuing. Interested readers are encouraged to send their comments to the authors on possible changes and addition to questions listed in Table 3.

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