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A Methodology for Quality Assurance of Knowledge Economy Statistical Indicators

**The Communication of Risks and Uncertainties for a
Continuous Improvement**

Maurizio Sajeve

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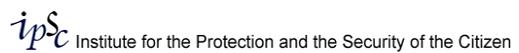
A Methodology for Quality Assurance of Knowledge Economy Statistical Indicators

The communication of risks and uncertainties for a continuous improvement

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TABLE OF CONTENTS

| | |
|--|-----------|
| EXECUTIVE SUMMARY | 4 |
| 1 APPRAISING QUALITY OF INDICATOR BUILDING PROCESSES: UNCERTAINTY AND QUALITY ISSUES IN SOCIO-TECHNOLOGICAL SYSTEMS | 5 |
| 1.1 Participation In Science As A Key Strategy For The Knowledge Economy..... | 8 |
| 1.2 Methodology For Quality Assessment Of Knowledge economy indicators' Building Processes | 9 |
| 2 THE MODEL DEVELOPMENT APPLIED TO NESIS (New Economy Statistical Information System) PROJECT | 11 |
| 2.1 A first approach..... | 12 |
| 2.2 A further development: opting for quality instead of quantity..... | 15 |
| 2.3 The final product: appraising performance according to successive steps of the process | 16 |
| 3 OUTCOMES AND CONCLUSIONS..... | 20 |
| 4 FUTURE DEVELOPMENTS of QUALITY ASSURANCE OF STATISTICAL INDICATORS | 22 |
| APPENDIX: QUESTIONS AND COMMENTS DURING THE INTERVIEW AT CBS. | 24 |
| References..... | 34 |

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EXECUTIVE SUMMARY

The NESIS project has been carried out in order to provide a set of indicators for the measurement of the new economy. The contribution of the KAM sector focused on the quality appraisal of indicators' building process. This article describes how to deal with the complexity of a socio-technological system and identifies the critical aspects related to the e-Europe indicators building process. Taking as a starting point the existing theory on quality assurance and the use of pedigree matrices, the development of a dedicated model is described. As a result, the assessment of the basic assumptions and cultural/organisational background for the development of indicators is pursued. The quantity and quality of the information carried by indicators is as well highlighted, in accordance with a concept of extended participation and communication of existing or unexpected risks and uncertainties.

1 APPRAISING QUALITY OF INDICATOR BUILDING PROCESSES: UNCERTAINTY AND QUALITY ISSUES IN SOCIO-TECHNOLOGICAL SYSTEMS

Economic background: the impact of the knowledge economy

The emergent concept of '*Knowledge economy*' has got, in relation of Lisbon objectives, a central role. On the other hand, it seems that its measurement, through statistical indicators, is too often simply based on a limited number of aspects.

The basic assumption is the consideration of a broader definition of economic development, concerning social and economic changes to be expressed mainly in a qualitative sense and not in terms of quantity. So, the impact of new technologies on economic systems and the existing risks and uncertainties are given, in this work, a major importance and represent the basis on which the qualitative appraisal is built¹.

Socio-political background: complexity of socio-technological systems

The field object of study has to be seen, in our view, as a complex system, in which human, political, social and technical aspects interact. Socio-technological systems are not related, in our belief, specifically to the simple application of given techniques to a specific task, but they involve a complex of interrelations with society, risks and elements of uncertainty, human and political factors, values and subjective views from different cultures and educational backgrounds.

Post-normal science

This approach of qualitative appraisal descends from a different conception of complex science-related issues (*Post-Normal Science*, Funtowicz and Ravetz 1992, 1993, 1999, Ravetz 1999) and considers the traditional scientific concern unable to deal with complex systems where uncertainties and stakes are high (for example risks are unknown or damages are irreversible) and decisions urgent. Whenever systems are recognised of higher complexity, new key concepts of problem solving are given a central role in their evaluation. They refer in particular to:

- Uncertainty;
- Stakes and value-loading;
- Urgent decision-making;
- Participation in science-policy processes;
- Related tools of quality assurance for their representation.

¹ Maurizio Sajeve, *The illusion of Information and Communication Technologies* - NESIS proceedings, November 2004

In the normal science of T. S. Kuhn theory, policy decision-making is based on a representation of phenomena by simple and certain scientific applications for problem solving. Instead, a dynamic and interrelated conception of science would be able to put in doubt present assumptions and make knowledge, understanding, and development of new scientific methods negotiable. The complex nature of systems and the related uncertainties and risks, cannot in fact be underestimated. They have to be analysed in every component and from different perspectives. The term 'science' is traditionally associated with 'truth', where instead science is a continuous research through elements of uncertainty and dispute, while policy would like it to provide urgent solutions to tasks in which the interests are high and decisions hard. Scientific achievements are traditionally communicated to society with their dogmatic power, in a sort of competition for making them more certain and useful for decision-making processes.

Traditional science is therefore necessary but not sufficient anymore to represent the complexity and the interrelations of systems. Problems have often more than only one solution, and many of them have no well-defined scientific answer at all. The representation of scientific information by different units of measurement is often detached from specific contexts and from different possible subjective interpretations. Value loading is not taken into account. Phenomena are usually oversimplified and solved by techniques of accepted science and any other approach is blindly refused. Participation of non-formally qualified people is not admitted in evaluation processes.

Communication to society

In this context, the challenge is to make scientific information more transparent and closer to citizens by revealing its connotations of uncertainty, instead of communicating nice illusions of perfection and hyper-precision. The communication of uncertainties becomes here a key element for a higher quality of scientific information and a deeper interaction among technology, science, policy and society.

Participation

In order to fulfill the above-mentioned objectives, appropriate participatory methodologies are designed and applied to the scientific information and its development process. Different points of view for measurement, both quantitative and qualitative, have to be taken into account to highlight an overall picture of phenomena and to provide higher levels of quality and knowledge.

The following flow-chart represents the socio-technological system with the existing interactions.

INTERACTIONS IN SOCIO-TECHNOLOGICAL SYSTEMS

KNOWLEDGE ECONOMY AND TECHNOLOGICAL DEVELOPMENT

↑
**INNOVATION &
SCIENTIFIC RESEARCH**

↑
**RESOURCES
(factors of production)**

↑
POLICY-MAKING

**1. ECONOMIC
DEVELOPMENT &
QUALITY OF LIFE**

**2. POSITIVE
IMPACTS AND
FEEDBACKS**

**3. NEGATIVE
IMPACTS AND
FEEDBACKS**

**SOCIO-
TECHONOGICAL
INTERACTIONS IN THE
KNOWLEDGE
ECONOMY: major changes
in economic structures and
in the behaviour of
operators, uncertainties,
risks, value-loading,
contextualisation**

**4. INTERRELATIONS AND
PARTICIPATION: THE
KNOWLEDGE SOCIETY**

SOCIETY

1.1 *Participation In Science As A Key Strategy For The Knowledge Economy*

Extended participation

According to the theoretical background described above, whenever value-loadings and uncertainties become critical elements to the quality of the product "scientific information" addressed to "political customers", an additional element of participation in decision-making and framing of problems is required. A so-called 'extended peer community' is charged to give its contribution to the identification of critical points regarding the existing uncertainties, the values and the quality aspects, which can best frame the phenomenon object of study. In this way a quantitative measurement, such as a set of indicators, can be linked to its context of application and to the interpretation of developers and users. This contextualization of the analytical measure generates value-added information with its insights of uncertainty and value-loading.

This approach does not refer only to a "democratic participation". It aims in fact to contribute to quality-assurance for a complex system not manageable by traditional science. Participation is not reserved only to experts, professionals' associations and stakeholders but rather extended to all those who are interested. Whenever policy-makers are not able to manage a given problem of a certain level of complexity, those communities are called to participate to build greater consensus. They assume names like 'juries', 'conferences', 'citizens', and are called to assess proposals, scientific or political, and can involve somehow moral and political aspects. Sometimes those participants search actively for material, which has not been necessarily delivered to them. Clearly, participation represents not only a methodology for problem solving, but is also a contribution for the progressive construction of a knowledge-based society, in which everyone is given a voice in dealing with complex issues.

Interfaces between science and society: the communication of risks and uncertainties

In the specific context of socio-technological systems, the economic strategy for Lisbon 2010 goals, founded on the construction of a knowledge-based society, involves a new consideration of the relations and interfaces between science, technology and society. Knowledge, creativity and technological development, taken as main factors of growth, constitute a complex system in continuous interaction with society, which has to be measured not just by indicators but put in relation to different contexts, interests, values and elements of uncertainty. For, an extended participation of citizens to the evaluation of the impacts of technological achievements on their own sphere is a tool by which the analysis is adapted to different realities.

A growth in spread of scientific concern and in exchange of information and skills, too often limited to a monopolistic and separate class, constitutes then a further step towards participation. Besides technological development, the future emerging factors of growth are identified in increase of education and knowledge, human capital, expertise.

Knowledge-based society

In this discourse, citizens and their 'knowledge' constitute the central source of development. Social cohesion, labour policies, access to education and positive right are, as a consequence, considered as key factors. Appropriate evaluation tools are needed for measuring the knowledge-based economy that drives the future integration and common development of EU Member States.

Even Lisbon goals for 2010 are susceptible to be revised, also in the consideration of the difficulties for them to be actually reached.

Links:

<http://euobs.com/index.phtml?sid=9&aid=14916>
<http://www.euobserver.com/index.phtml?aid=14844>

"Economic goals

The EU's own goal of becoming the most dynamic economy in the world by 2010 will also be dealt with. Leaders will discuss how far the EU has come with this ambitious goal. A key element in their discussions will be a report by former Dutch Prime Minister Wim Kok - entitled jobs, jobs, jobs".

The report says that to succeed in creating more jobs, Europe needs to invest more in training and retraining workers and improve economic policy to coerce people into the labour market.

(http://europa.eu.int/comm/employment_social/employment_strategy/pdf/etf_en.pdf)

1.2 Methodology For Quality Assessment Of Knowledge economy indicators' Building Processes

Focusing on the measurement of knowledge-economy by statistical indicators, we refer to the following themes, which have been considered at the base of the quality appraisal:

- ❑ Interpretation issues for the framing of the problem;
- ❑ Processing of information;
- ❑ Negotiation;
- ❑ Context of application in different EU Member States;
- ❑ Flexibility and adaptability of the organisation, internal culture, learning
- ❑ Communication and transparency of elements of uncertainty;
- ❑ Consideration of emergent unexpected issues and strategy change;
- ❑ Internal/External participation: stakeholders, experts and extended peer community;
- ❑ Continuous development and monitoring of statistical information.

The statistical quantitative measurement

The use of statistical information has, as a main task in the framework of the knowledge-economy, the measurement of that part of the recent economic development, which has arisen as a consequence of the technological and human progress and related sectors. So, the first step needed for a proper measurement of the phenomenon is the identification and assessment of all those related impacts, quantitatively measurable, which mostly affect the society. Whenever dealing with different kinds of technologies, which characterise the structure of the economy, the elements of interaction between technological development and society can be determined.

The qualitative assessment

Such measurement can be added, according to a systemic conception of socio-technological interactions, by a qualitative assessment, able to capture the particular elements of the contexts to which the system applies. In a complex socio-technological system in fact, we have to deal with a certain set of interrelations which cannot be reduced to a numerical and objective evaluation. The impacts on different actors and sub-systems are not determinable in a univoque way. They are subject to various interpretations by different stakeholders and experts and they have different characteristics depending on the context in which they are measured. The interactions of

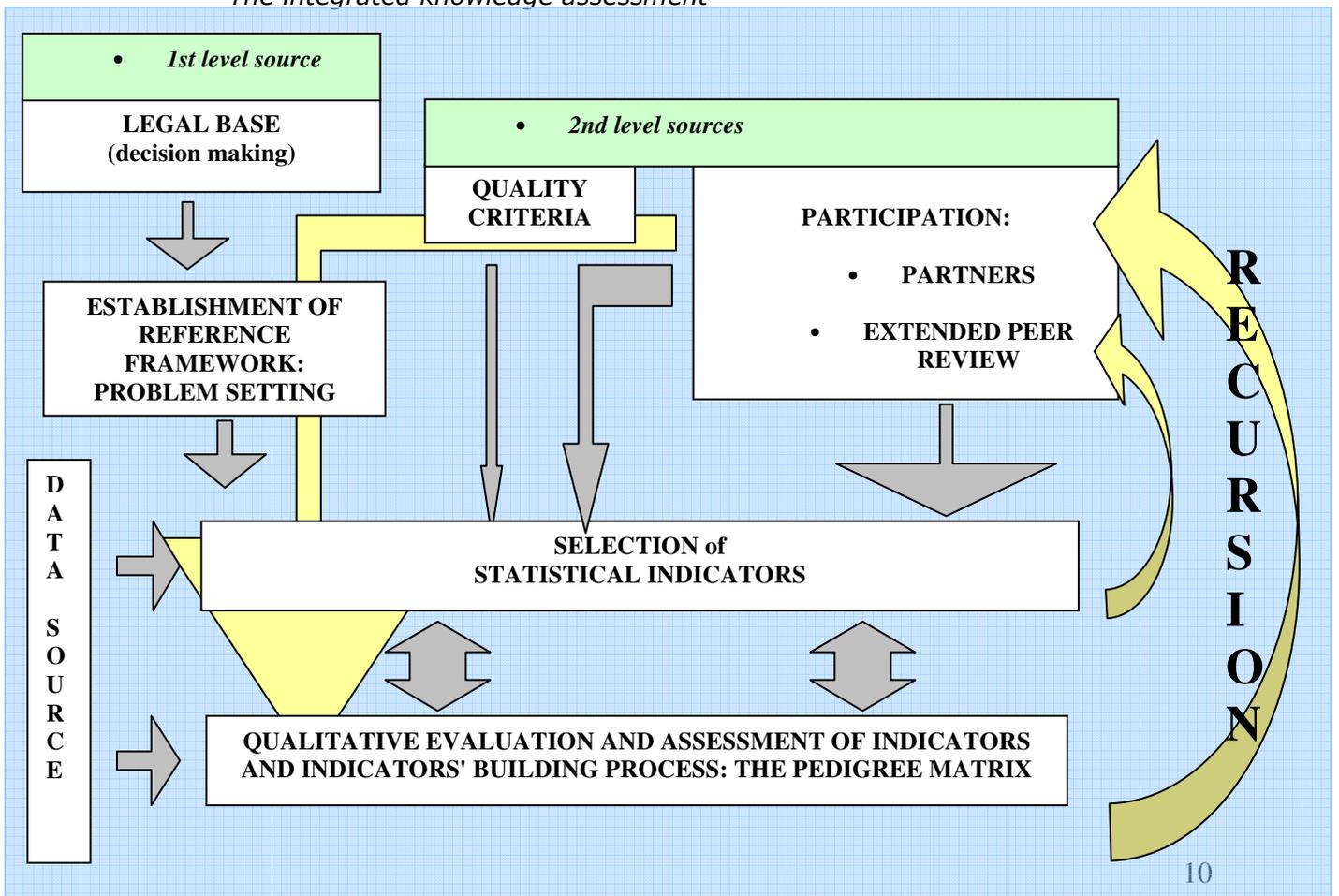
technology on citizens' life might be very different in different cultural, societal and economic contexts.

The qualitative assessment, situated in an interlocutory position face to traditional conceptions of science and technology, is the tool for assessing analytical measurements, and in particular statistical indicators, in relation to the context of application and to the interpretation of different actors, stakeholders or participants. In particular, it contributes to highlight critical uncertainties and value-loadings, which are hidden behind indicators and then not detectable.

As a further contribution, a second goal of quality assurance applied to related statistical measurements, is to make scientific information closer to users, stakeholders, policy makers and citizens, increasing the interactions between them and enhancing the trend towards a knowledge-based society. The knowledge economy has then a role for creating deeper consciousness of citizens, which could lead to the collapse of monopolistic scientific expertise, as well as amplifying, eventually, the voice of fringe scientists. A patient, after a visit to the doctor, would be able to search the web and get soon maybe even more information on a disease and the related medical treatments than the doctor himself already has. ICT and higher levels of expertise spread among citizens give them the ability to put in doubt accepted scientific assumptions.

In order to deal with a situation of apparent anarchy, where huge amount of information is spread and experts and stakeholders make their own objections to scientific assumptions, trying to polarise interpretations to own interests and uses, an assessment of information and its quality allows to highlight different views and to communicate their peculiarities.

The integrated knowledge assessment



The qualitative evaluation might concern different aspects of scientific information, such as availability, transparency, understanding, possibility of criticism, participation of associations, stakeholders and extended peer review, publication of results.

Quality

As previously mentioned, there is not, in principle, one correct way to measure a phenomenon by indicators as they are *par excellence* a type of scientific information which are heavily influenced by the particular framing of the problem at hand. This part of the project then wants to contribute to the relevance of indicators as a type of scientific information usable for policy-making and enhance their social and methodological robustness.

In this sense it is no longer 'truth' representation of underlying phenomena, which is the ultimate yardstick for indicator development but 'quality'. Then quality of scientific information has to be explained in the following terms:

- it relates to its 'fit for use', thus to its relevance for users in policy and society;
- it is related to how uncertainty is managed, as an inherent element of quality;
- it concerns problem framing as a first basic step in indicator development and then uncertainty assessment can not be limited to technical features but has to include concepts such as indeterminacy and ignorance. Comment on the different types of uncertainty addressed in the quality framework to be developed and illustrate with examples.

The qualitative framework: the pedigree methodology

The mentioned basic assumptions have led us to develop a particular quality evaluation framework that should first involve an extension of the peer community and secondly treat the indicators' development process as a discursive practice respecting some clear standards. Such a framework addresses the crucial aspects of quality and uncertainty through assessing the background of indicators' building process, which takes here the particular name of "pedigree". A pedigree for numbers is an evaluation of their formation process. It results in a model for quality and uncertainty evaluation, in which every relevant step and aspect of the generation process is analysed and classified by the assignment of previously identified qualitative attributes. Quality is not something added to the indicator. It is a crucial element hidden inside it and essential for the usability of the information delivered. The model is able to put in evidence those hidden aspects, which characterise the qualitative level of the treated information. In particular, the evaluation of the quality of indicators' building process concentrates on the indicators' developing modes and on the nature of the actors involved.

Quality in itself is a normative standard which can not be captured in numbers or in mere labels, it gets its meaning only through discussion and negotiation among those involved. Criteria, such for instance 'rigour', are used when judging whether science is developed in a qualitatively good way. However, it is not possible to decide *a priori* and once and for all what *rigour* actually means. It is necessary to attach criteria to the context because the particular application of a practice to be assessed is able to identify whether 'rigour' is present or not.

2 THE MODEL DEVELOPMENT APPLIED TO NESIS (New Economy Statistical Information System) PROJECT

The mentioned "pedigree" has been modeled in a matrix², which has developed in further steps, during an analysis of the overall process of NESIS indicators'

² Uncertainty and Quality in Science for Policy, by S.O. Funtowicz and J.R. Ravetz, (Kluwer Academic, 1990)

development and their representation in the final statistical publication. This model has meant to highlight the development history of indicators and represents also a key strategy for the continuous improvement of their quality.

2.1 A first approach

In the phase of NESIS WP4 a first version of pedigree matrix was proposed as an appraisal tool of the quality of indicators' building process, where domains and modes have been adopted in order to describe the different steps of the process and the principles and criteria representing the cultural and organisational background.

The domains and scoring of the first pedigree matrix

| DOMAINS AND MODES | SCORES | LOWER LEVEL SCORES | UPPER LEVEL SCORES |
|---|--------|--------------------|--------------------|
| 1. Definition & standards | | 3 | 4 |
| <i>Negotiation</i> | 4 | | |
| <i>Science</i> | 3 | | |
| <i>Convenience</i> | 2 | | |
| <i>Symbolism</i> | 1 | | |
| <i>Inertia</i> | 0 | | |
| <i>unknown</i> | | | |
| 2. Data collection & analysis | | 3 | 4 |
| <i>Task-force - European Statistical System (ESS)</i> | 4 | | |
| <i>Direct survey</i> | 3 | | |
| <i>Indirect estimate</i> | 2 | | |
| <i>Educated guess</i> | 1 | | |
| <i>Fiat</i> | 0 | | |
| <i>unknown</i> | | | |
| 3. Institutional culture | | 3 | 4 |
| <i>Open dialogue</i> | 4 | | |
| <i>Leader-follower discussion</i> | 3 | | |
| <i>Obedience</i> | 2 | | |
| <i>Evasion</i> | 1 | | |
| <i>No-contact</i> | 0 | | |
| <i>Unknown</i> | | | |
| 4. Legal base | | 0 | 4 |
| <i>Complete adherence to a normative cycle</i> | 4 | | |
| <i>Reference to normative framework</i> | 3 | | |
| <i>Systematic</i> | 2 | | |
| <i>Occasional normative approaches</i> | 1 | | |

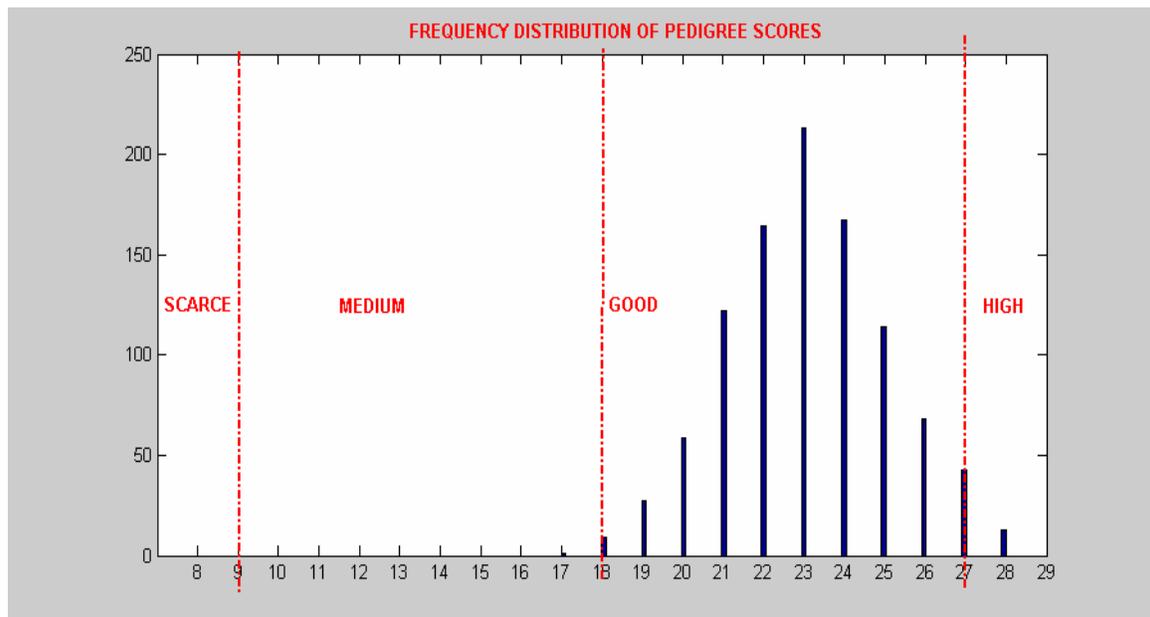
| | |
|----------------|---|
| <i>Casual</i> | 0 |
| <i>unknown</i> | |

| DOMAIN | SCORES | LOWER LEVEL SCORES | UPPER LEVEL SCORES |
|--|--------|--------------------------|--------------------------|
| 5. Plurality of perspectives (minority views) | | 2 | 4 |
| <i>Complete pluralism, cultural and societal (minority views)</i> | 4 | | |
| <i>Intercultural pluralism</i> | 3 | | |
| <i>Occasional pluralism</i> | 2 | | |
| <i>Expertise in the field from different views</i> | 1 | | |
| <i>Expertise restricted to a single view</i> | 0 | | |
| <i>unknown</i> | | | |
| 6. Peer acceptability (resonance) | | 2 | 3 |
| <i>General acceptability</i> | 4 | | |
| <i>Agreement</i> | 3 | | |
| <i>Compromise</i> | 2 | | |
| <i>Dominant position</i> | 1 | | |
| <i>Unilateral adoption</i> | 0 | | |
| <i>unknown</i> | | | |
| 7. Political relevance and stakeholders' participation | | 2 | 2 |
| <i>External + Experts' + Stakeholders' + political participation</i> | 4 | | |
| <i>Stakeholders' + Experts' + political participation</i> | 3 | | |
| <i>Experts' + political participation</i> | 2 | | |
| <i>Political participation</i> | 1 | | |
| <i>None</i> | 0 | | |
| <i>unknown</i> | | | |
| 8. Testing | | 1 | 3 |
| <i>Corroboration</i> | 4 | | |
| <i>Uncertainty analysis + sensitivity analysis</i> | 3 | | |
| <i>Uncertainty analysis</i> | 2 | | |
| <i>Standard statistical tests</i> | 1 | | |
| <i>None</i> | 0 | | |
| <i>unknown</i> | | | |

| | | | | |
|------------------|---------------------------|---|-----------|-----------|
| 9. Review | | | 1 | 1 |
| | <i>External/recursive</i> | 4 | | |
| | <i>Independent</i> | 3 | | |
| | <i>Regular</i> | 2 | | |
| | Occasional | 1 | | |
| | <i>None</i> | 0 | | |
| | <i>unknown</i> | | | |
| Total | | | 17 | 29 |

The results of the interviews carried out with the indicators' developers are formalised in the pedigree matrix, in which the columns represent the different phases of the process. Each of the columns contains modes, which are normatively ranked descriptions of relevant aspects of the development process, graded by scores (or, alternatively, by simple qualitative attributes). The modes describe the different scenarios that characterize the process, and show the level of negotiation, participation, communication of risks and uncertainties, plurality, flexibility, contextual analysis and complexity contained in the process. Those main principles, already described above, are the conceptual criteria on which the columns of the matrix are built. The processing of all the scores, and their transformation in percentages of performance for each column, provides an assessment of the quality, a sort of "quality index". The results obtained suggest recursive action for the improvement of the process. At this stage, scores, correspondent to qualitative attributes applied to different steps of the process, have been processed by a Monte Carlo simulation to obtain finally their frequency distribution and a positioning of the same process in a certain quality range. The highest frequencies are located in the range corresponding to an attribute of "good" quality.

| ASSESSMENT | |
|-------------------|--------|
| From 28 to 36 | High |
| From 19 to 27 | Good |
| From 10 to 18 | Medium |
| From 1 to 9 | Scarce |
| 0 | Poor |



2.2 A further development: opting for quality instead of quantity

In a second phase, scores have been replaced by qualitative attributes. The reason for this choice consisted in the idea that scores might look like as marks or grades, and assigning good or bad marks to a certain process is not the purpose of the analysis. Instead, the methodology aims to be the source for the start and the prosecution of a virtuous cycle for qualitative improvement. So, the choice of using qualitative attributes seemed, according also to several consultations, more able to fit with our aim. Actually the attributes did work: after two further interviews to Statistics Finland (STATFIN) and to the Dutch Central Bureau of Statistics (CBS), the actors have got more consciousness about their possibilities of further improvement.

Besides, the model highlighted the existing differences between the two Institutes, in terms of understanding the effects and the implications coming from the use of the same given set of indicators in different contexts.

2.3 The final product: appraising performance according to successive steps of the process

The further developments have seen the special interest of CBS in using the model as a valid tool for monitoring and improving the quality of its process for realising the NESIS final statistical publication. So, the methodology has been adjusted again according to the particular characteristics of CBS activity, and the joint work realised during three successive meetings of JRC and CBS (including consultations with STATFIN) has given very good results, in reaching the common objective of evaluating the quality of the NESIS statistical publication. This discourse implies more robustness and transparency of the NESIS project by the identification of those elements of uncertainty, which are known, the demand of more public participation and a principle of continuous improvement. A principle of flexibility is highly recommended in order to deal with those emergent issues and upcoming risks and uncertainties³, which were unknown in advance. Whenever dealing with complex systems, as already said, the capacity of transformation and adaptation to front new emergent events plays a key role for a proper representation of phenomena.

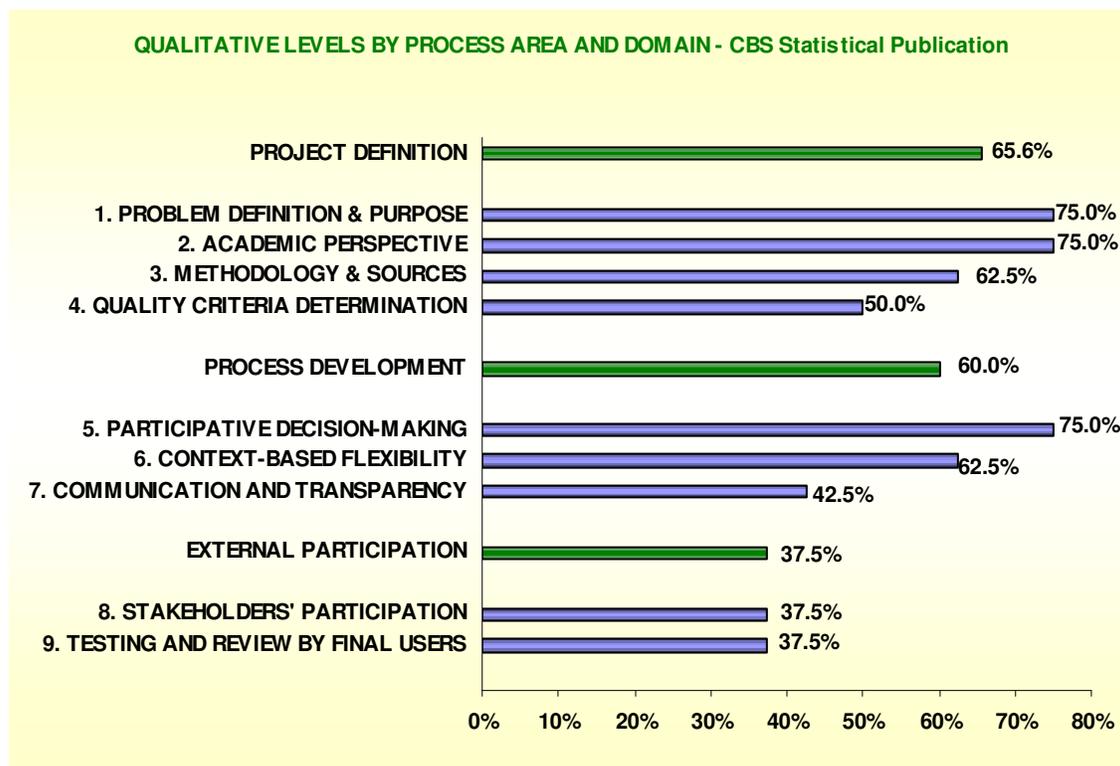
The new model of the matrix is divided into three general areas. The reformulation of domains and modes has followed an accurate and cooperative analysis of the steps of the process and of their most relevant aspects affecting the quality of the final product, trying at the same time to appear more simple and user-friendly. However, the main change refers to the use of percentages of performance, which replace the qualitative attributes, according to the intention of avoiding the assignment of marks of quantitative or qualitative nature. The final aim is the determination of weaknesses and the impulse for new actions of improvement in the different steps of the process. According to the latest version of the matrix, the domains and the modes of each domain are explained in detail as follows. The questionnaire that has been submitted to developers is described in appendix.

³ Mintzberg, Ahlstrand, Lampel - *Strategy Safari* (Financial Times Prentice Hall, 1998).

The domains and scores of the pedigree matrix

| DOMAINS AND MODES | SCORES | PERCENTAGE |
|--|-------------|---------------------------|
| PROJECT DEFINITION (max = 16) | | |
| 1. PROBLEM DEFINITION & PURPOSE | | 3*100/4 75% |
| NEGOTIATION | 4 | |
| SCIENCE-BASED | 3 | |
| DIFFERENCE SUBJECTIVE INTERPRETATION | 2 | |
| ABSTRACT | 1 | |
| TO BE EXPLORED | 0 | |
| 2. ACADEMIC PERSPECTIVE | | 3*100/4 75% |
| NEGOTIATED INTERDISCIPLINARY PERSPECTIVE | 4 | |
| FOCUSED INTERDISCIPLINARY PERSPECTIVES | 3 | |
| WELL ESTABLISHED MULTI-DISCIPLINARY PERSPECTIVES | 2 | |
| WELL ESTABLISHED MONO-DISCIPLINARY PERSPECTIVES | 1 | |
| NO COMMON PERSPECTIVE (ABSENCE OF CONSENSUS) | 0 | |
| 3. METHODOLOGY & SOURCES | | 2,5*100/4 62,5 |
| CONSENSUS BASED METHODOLOGY AGREED BY THE PARTNERS | 4 | |
| WELL DEFINED EXPERTS FOR AD HOC METHODOLOGY | 3 | |
| COMMON PRACTICES | 2 | |
| BROAD SUGGESTIONS ONLY | 1 | |
| NOT DEFINED | 0 | |
| 4. QUALITY CRITERIA DETERMINATION | | 2*100/4= 50% |
| CONSENSUS BASED METHODOLOGY AGREED BY THE PARTNERS | 4 | |
| WELL DEFINED EXPERTS FOR AD HOC METHODOLOGY | 3 | |
| COMMON PRACTICES | 2 | |
| BROAD SUGGESTIONS ONLY | 1 | |
| NOT DEFINED | 0 | |
| TOTAL | 10,5 | 10,5*100/16= 65,6% |
| PROCESS DEVELOPMENT (max = 12) | | |
| 5. PARTICIPATIVE DECISION-MAKING | | 3*100/4 75% |
| CO-DETERMINATION | 4 | |
| DECISION-MAKING BASED ON OPEN DISCUSSION | 3 | |
| TOP-DOWN DECISION-MAKING | 2 | |
| OCCASIONAL CONSULTATIONS | 1 | |
| NO INTERACTION | 0 | |
| 6. CONTEXT-BASED FLEXIBILITY | | 2,5*100/4 63% |
| ADAPTABILITY TO FUTURE TRANSFORMATIONS VERSUS EMERGENT ISSUES - PERIODS OF STABILITY AND TRANSITION, AD HOC CONTEXT BASED ANALYSIS | 4 | |
| FLEXIBILITY, OCCASIONAL RE-DESIGNING, LEARNING PROCESS AND KNOWLEDGE CREATION, EMERGENT FROM THE CHANGES | 3 | |
| COGNITIVE CREATIVE MENTAL PROCESS | 2 | |
| DETERMINISTIC LONG-TERM VISION - DELIBERATE AND EXPLICIT STRATEGIES | 1 | |
| UNIQUE CONCEPTUAL DESIGN AND PLANNING: CONSCIOUS PROCESS - FULLY DELIBERATE FRAMEWORKS (STRONG LEGAL BASE) | 0 | |
| 7. COMMUNICATION AND TRANSPARENCY | | 1,7*100/4 43% |
| EXPLICIT COMMUNICATION OF UNCERTAINTIES | 4 | |
| STRONG AWARENESS OF UNCERTAINTIES | 3 | |
| WEAK AWARENESS OF UNCERTAINTIES | 2 | |
| RELIANCE ON PERSONAL INTUITION AND EXPERIENCE | 1 | |
| COMPLETE CONTROL, AVOIDANCE OF UNCERTAINTIES | 0 | |
| TOTAL | 7,2 | 7,2*100/12= 60% |

| DOMAIN | SCORES | PERCENTAGE |
|---|----------|------------------------|
| EXTERNAL PARTICIPATION (max = 8) | | |
| 8. STAKEHOLDERS' PARTICIPATION | | 1,5*100/4 37,5% |
| <i>PARTICIPATION BY USERS' GROUPS + EXTERNAL EXPERTS + STAKEHOLDERS + EXTENDED PEER COMMUNITY</i> | 4 | |
| <i>PARTICIPATION BY USERS' GROUPS + EXTERNAL EXPERTS + STAKEHOLDERS</i> | 3 | |
| PARTICIPATION BY USERS' GROUPS + EXTERNAL EXPERTS | 2 | |
| PARTICIPATION BY USERS' GROUPS | 1 | |
| NONE | 0 | |
| 9. TESTING AND REVIEW BY FINAL USERS | | 1,5*100/4 37,5% |
| <i>CONTINUOUS FEEDBACK FROM FINAL USERS</i> | 4 | |
| <i>INVITED COMMENTS ON DRAFT PUBLICATION</i> | 3 | |
| EX-POST EVALUATION BASED ON INVITED FEEDBACKS | 2 | |
| EX-POST EVALUATION BASED ON PRESS REVIEWS AND OTHER OPINIONS | 1 | |
| NONE | 0 | |
| TOTAL | | 3*100/8= 37,5% |



QUALITY APPRAISAL OF THE GENERATION PROCESS OF NESIS FINAL PUBLICATION (coordination with and interview to CBS)

| GRADING SCALE | PROJECT DEFINITION | | | | | PROCESS DEVELOPMENT | | | | EXTERNAL PARTICIPATION | | | FINAL ASSESSMENT | |
|---------------|--------------------------------------|---|--|--|-----------------------|--|--|---|------------------------|--|--|---------------------------|------------------|------------------|
| | 1 | 2 | 3 | 4 | PARTIAL ASSESSMENT | 5 | 6 | 7 | PARTIAL ASSESSMENT | 8 | 9 | PARTIAL ASSESSMENT | max = 36 | PERFORMANCE in % |
| | PROBLEM DEFINITION & PURPOSE | ACADEMIC PERSPECTIVE | METHODOLOGY & SOURCES | QUALITY CRITERIA DETERMINATION | 1. PROJECT DEFINITION | PARTICIPATIVE DECISION-MAKING | CONTEXT-BASED FLEXIBILITY | COMMUNICATION AND TRANSPARENCY | 2. PROCESS DEVELOPMENT | STAKEHOLDERS' PARTICIPATION | TESTING AND REVIEW BY FINAL USERS | 3. EXTERNAL PARTICIPATION | | |
| | | | | | 16 | | | | 12 | | | 8 | 36 | |
| 4 | NEGOTIATION | NEGOTIATED INTERDISCIPLINARY PERSPECTIVE | CONSENSUS BASED METHODOLOGY AGREED BY THE PARTNERS | CONSENSUS BASED METHODOLOGY AGREED BY THE PARTNERS | | CO- DETERMINATION | ADAPTABILITY TO FUTURE TRANSFORMATIONS VERSUS EMERGENT ISSUES - PERIODS OF STABILITY AND TRANSITION, AD HOC CONTEXT BASED ANALYSIS | EXPLICIT COMMUNICATION OF UNCERTAINTIES | | PARTICIPATION BY USERS' GROUPS + EXTERNAL EXPERTS + STAKEHOLDERS + EXTENDED PEER COMMUNITY | CONTINUOUS FEEDBACK FROM FINAL USERS | | 0 | 0.00% |
| 3 | SCIENCE-BASED | FOCUSED INTERDISCIPLINARY PERSPECTIVES | WELL DEFINED EXPERTS FOR AD HOC METHODOLOGY | WELL DEFINED EXPERTS FOR AD HOC METHODOLOGY | | DECISION-MAKING BASED ON OPEN DISCUSSION | FLEXIBILITY, OCCASIONAL RE-DESIGNING, LEARNING PROCESS AND KNOWLEDGE CREATION, EMERGENT FROM THE CHANGES | STRONG AWARENESS OF UNCERTAINTIES | | PARTICIPATION BY USERS' GROUPS + EXTERNAL EXPERTS + STAKEHOLDERS | INVITED COMMENTS ON DRAFT PUBLICATION | | 16.5 | 45.83% |
| 2 | DIFFERENCE SUBJECTIVE INTERPRETATION | WELL ESTABLISHED MULTIDISCIPLINARY PERSPECTIVES | COMMON PRACTICES | COMMON PRACTICES | | TOP-DOWN DECISION-MAKING | COGNITIVE CREATIVE MENTAL PROCESS | WEAK AWARENESS OF UNCERTAINTIES | | PARTICIPATION BY USERS' GROUPS + EXTERNAL EXPERTS | EX-POST EVALUATION BASED ON INVITED FEEDBACKS | | 5.0 | 13.89% |
| 1 | ABSTRACT | WELL ESTABLISHED MONO-DISCIPLINARY PERSPECTIVES | BROAD SUGGESTIONS ONLY | BROAD SUGGESTIONS ONLY | | OCCASIONAL CONSULTATIONS | DETERMINISTIC LONG-TERM VISION - DELIBERATE AND EXPLICIT STRATEGIES | RELIANCE ON PERSONAL INTUITION AND EXPERIENCE | | PARTICIPATION BY USERS' GROUPS | EX-POST EVALUATION BASED ON PRESS REVIEWS AND OTHER OPINIONS | | 0 | 0.00% |
| 0 | TO BE EXPLORED | NO COMMON PERSPECTIVE (ABSENCE OF CONSENSUS) | NOT DEFINED | NOT DEFINED | | NO INTERACTION | UNIQUE CONCEPTUAL DESIGN AND PLANNING: CONSCIOUS PROCESS - FULLY DELIBERATE FRAMEWORKS (STRONG LEGAL BASE) | COMPLETE CONTROL, AVOIDANCE OF UNCERTAINTIES | | NONE | NONE | | 0 | 0.00% |
| total | 3 | 3 | 2.5 | 2 | 10.5 | 3 | 2.5 | 1.7 | 7.2 | 1.5 | 1.5 | 3 | 21.5 | 59.72% |
| % | 75.00% | 75% | 62.50% | 50% | 65.63% | 75.00% | 63% | 43% | 60.00% | 37.50% | 37.50% | 37.50% | | |

3 OUTCOMES AND CONCLUSIONS

In the present case, an internal process of review in cooperation with Member States is carried out, through the ESTAT task force. The review is however limited to statistical issues. The revision of the indicators set is occasional and carried on initiative of the Commission Presidency. A specific mechanism for the revision of the indicator set to monitor the resonance of the set to policies is not specifically foreseen.

The Finnish case

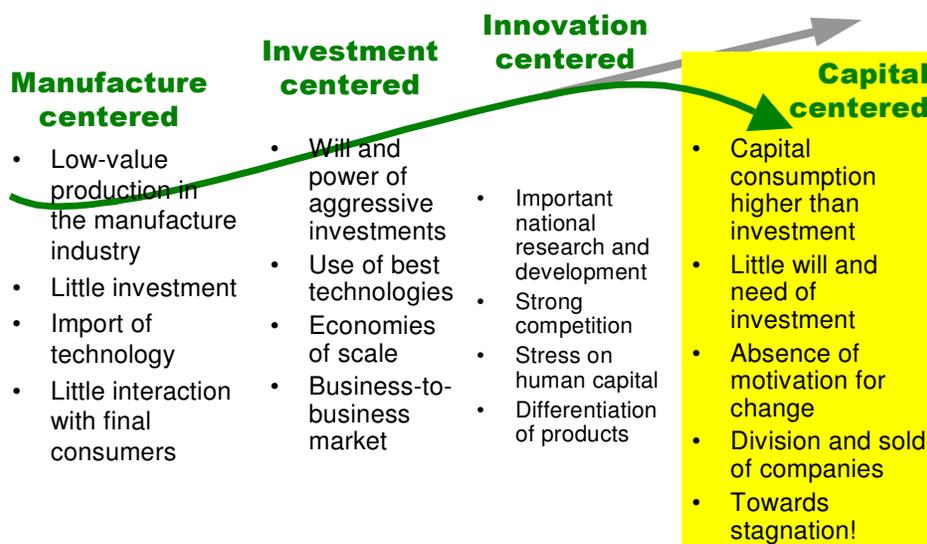
The first interview, addressed to Statistics Finland, has concentrated on the development process of indicators for e-citizenship, ICT impact on business, and enterprise dynamics. During the discussion, inspired by the different domains of the pedigree matrix, the main critical points of the process have been highlighted. More, it has put in evidence the context in which indicators have been applied, by giving a relative importance to the single domains and by discussing the relevance and resonance of indicators in relation to the specific environment.

According to STATFIN, in fact, the Finnish context is so different from that of other European countries, that some indicators are meaningful only locally and lose their strength when exported abroad. The challenge would be the linkage indicators and even the quality appraisal to the



The development of competitiveness in Finland

(sources: TEKES, ETLA)



7

specific context.

While in some countries ICT systems are probably still to be fully developed and used in everyday life, in the Finnish case, ICT technologies seem to have reached the edge, so that they are actually treated as old technologies. ICT devices and systems are considered in a sense similar to electrical apparatus. In a context in which almost all the population make use of ICT and high technologies in many moments of life, the measurement of their impact on citizens' life seems not giving useful results. According to some surveys, Finnish modern economy is in fact situated at the top of ICT innovations, and there is not a motivation for further developments. Whilst investments in production and innovation have decreased consumption is still high, and there is no need nor will for further growth (source: TEKES). Such a situation might constitute a risk for a future stagnation. So, the future challenge is to develop, besides ICT production, the creativity and the human resources needed to search for

new applications and uses of technologies. An Institution such as Statistics Finland would probably rather concentrate the research on future possible uses of ICT not already perceived or then, on the raising issues within Lisbon goals, about education and human resources.

The same indicators can in fact give different measures depending on the context to which they are applied. The measurement of the knowledge economy in Finland, for instance, in order to give a clear picture, should consider other aspects of Finnish economy and its future possibilities of growth. Other or ICT related fields, such for instance, the research on energy production systems, or that on the conception of new materials might represent areas for future economic development.

The model presented for the mentioned appraisal, has been judged by

STATFIN to be more suitable for the appraisal of the processes acting

inside the entire NESIS project than for the specific work made by

Statistics Finland. In fact, for the characteristics of NESIS project, the

process of generation of indicators has not followed, as normally happens,

the steps identified by the domains of the matrix itself. A 'meta-meta-

evaluation' has been proposed by STATFIN, in which aspects such as '*what*

we have learnt from NESIS', '*how NESIS could be improved*' or '*what are*

the outcomes'. In line with this suggestion, the methodology has been

refined, with the cooperation of CBS, and applied to the NESIS final

statistical publication, for which both CBS and STATFIN are main

contributors.

The application of the qualitative appraisal has described clearly the critical aspects of the process, which stays behind the statistical publication and the choice of indicators. It seems clear that NESIS weaknesses are mainly related to:

- ❑ **The non-consideration of those kinds of uncertainties related to risks and adverse effects and feedbacks coming from the development and implementation of ICTs, and the connected lack of their communication and transparency;**
- ❑ **The lack of extended participation and review ex-ante (users and stakeholders);**
- ❑ **The non-consideration of emergent issues, which could represent sources for future economic growth and for achieving Lisbon goals of knowledge-society, according to a long-run vision and to the different contexts for different MS;**
- ❑ **The partial disagreement on quality criteria;**
- ❑ **The partial lack of cooperation and integration (even the research for possible compromises) between different work-packages.**

The application to the NESIS final statistical publication: the critical aspects

**The information
carried by
indicators**

The quality appraisal just realised, as already mentioned, has been intended to provide additional levels of information about the elements of uncertainty contained inside eEurope 2005 indicators' building process, and finally in the generation of NESIS statistical publication. The result stays in giving outside users more complete information about the indicators, which have been developed. Interested public will then be able to use indicators within the limits they have. In other words, indicators are useful as long as they represent a good source of information. Whenever dealing with complex issues, in which a long-run vision for a more general and extended economic growth is needed, or in which adverse effects and additional costs are contained, they would probably not be the best instruments able to provide a full representation. NESIS indicators would probably be good tools of measurement for dealing with that part of economic growth related to ICTs, which, in modern economies, represents a clear sign of the area in which economy is centred. Clearly, Finnish policies cannot count on NESIS indicators for planning the future economic growth. They can instead count on them when studying the possibilities of integration with other European MS. CBS reports: *"the benchmark indicators can only produce warning or bliss signals that could help policymakers to reflect on the right issues, but they cannot be decisive as to how well an economy is performing given its particular historical context"*.

The result of the quality appraisal stays also in the identification of critical points and the possible future areas of improvement. By communicating the weaknesses, the research should be driven to further developments in given areas. Or then, as NESIS won't probably have any other development, to inform the partners about how future projects might be better planned.

No single practice is probably able to prevent from incompetence and abuse of statistics. We can't state that quality evaluations, such as pedigree, are able to suddenly change practices for the better, but by improved users' and clients' competence and consciousness about the relative quality and uncertainty of knowledge, we will at least create the basis for a deeper debate.

As a final recommendation, we would like to stress the importance of the recursive action of monitoring of the all building process and of the quality appraisal itself, for it is a key factor for the actual usefulness of the methodology, in the consideration of the continuous changing of economic facts and the necessary consequent change in the choice of indicators.

4 FUTURE DEVELOPMENTS of QUALITY ASSURANCE OF STATISTICAL INDICATORS

About the possible developments of the methodology, which have not been achieved, we can mention the possibility of checking the sensitivity of the matrix through more interviews.

A second matrix might be built for evaluation the interpretability and usability of indicators for outside users, the satisfaction they have from using them.

**Matters of
economic
stability**

The challenge of this methodology, when applied to economy-related indicators, is to base it on a strong economic background. In order to do that, the pedigree matrix should describe if indicators are actually taking into account the implications of innovation and technology on economic stability and on general changes coming from their implementation. A well-defined framework should work as a base of which the matrix is built, in order to highlight not only the critical aspects of the indicators' building process, but also the ability of indicators to describe the phenomenon in all its complexity. So, when looking at NESIS project, a further analysis

might regard the ability of indicators to describe the changes that innovation and technology have generated within the economic system. And, as a consequence, the changes adopted by economic systems to front the new challenges. Not just, for instance, the number of existing internet connections, which measure consumption of ICTs and not knowledge, creation and innovation inside an information society.

Besides the economic aspect, further information regarding the communication of risks and uncertainties could possibly be made more detailed.

APPENDIX: QUESTIONS AND COMMENTS DURING THE INTERVIEW AT CBS.

PROJECT DEFINITION: PROBLEM DEFINITION & PURPOSE

- About the **problem area**, how was it defined? Who was participating in the framing of the problem and what level of specialisation has been applied? **How the purpose has been defined?** Was it concerned with recommendations, solutions or just problem description?

CBS: The problem area refers to the fact that on the one hand there is a multitude of indicators about phenomena related to the New Economy, and on the other hand there is a shortage of central indicators. As far as the statistical publication is concerned, CBS has primarily taken into account already existing indicators that are embedded in established statistical systems allowing international benchmarking. CBS was asked to do the job because of its experience in writing similar statistical publications for the Netherlands.

- Has the final aim been reached?

CBS: Well, we have not finished the work yet. It appeared a much heavier job than was originally imagined. This required a re-planning of the work. I am confident, though, that we will succeed.

- Do you think that the **problem definition was negotiated or based on science?**

CBS: The project proposal was already defined, before CBS came in as a partner. However, as far as I am informed about the preparatory process, there have been negotiations between different actors over the contents of the project plan. I have the impression that even the final version of the project plan has suffered from this process in terms of clarity and consistency. The publication was scheduled and made concrete on the basis of the experience of CBS in the Netherlands. In that sense, you could call it "science based", although a better wording could be "based on the professional community that CBS is part of" and there is a tendency to conform to internationally accepted practices. By the way, in the Netherlands, statistics is not seen as a special science (there are no degrees in statistics, it is always connected to other disciplines). Most

scientists are interested in the use the data materials produced by the statistical offices; the making of them is less interesting for them. Moreover, a publication such as the Final Statistical Publication of the NESIS project is mainly made for policy makers. The scientists are primarily interested in databases.

PROJECT DEFINITION: ACADEMIC PERSPECTIVE

- Referring to the **academic perspectives**, have you taken into account **different cultures and interactions** or were there only limited points of view?

CBS: CBS, and in general official statistical offices, must perform a public service that should be open and interesting to different kind of players in society. There is a general understanding that we should go broad and not limit ourselves to a subjective opinion. The conceptual interpretation was given especially by me, in the sense that I looked for theoretical frameworks, but only after first complying with a broad understanding of the problem area with special reference to o the Lisbon Summit goals. We have a theoretical perspective based on mainstream (Keynesian) economic view, which has had a major influence on the way the statistical system has been organised (national accounts, input-output tables, sectors). We also referred to a context of national innovation system, which is also a broadly accepted framework. Both frameworks were adopted in the structure of the statistical publication. I would talk, referring to the matrix, about 'focused interdisciplinary perspectives'. I worked out different setups on my own but on the basis of internationally accepted models (OECD), which I integrated in one system. In other projects I was used to coming to agreement among the researchers about certain concepts and approaches. In the NESIS project there were interactions (particularly through e-mail messages) but in the end every work package leader had to make his own decisions.

- *Has been set, between different academic backgrounds, a discussion?*

CBS: During discussions in the IDWG there appeared to exist a fairly wide range of views, which hold each other in suspense, I had the feeling. There were pleas for holistic dynamic approaches that saw interrelationships everywhere but would avoid the distinction of causal effects as much as possible. For them the CBS systems approach with a broad view on economic and social phenomena and recognition of feed back mechanisms was even too static and/or too deterministic. Others would be happy with taking just the four pillars of NESIS also a model, even though these pillars did not show any relationships and were hard to interpret when it came to some degree of being specific. Taken together, CBS did not see a reason to alter its own model, except for an additional explicit relationship between the macro-economic context and the capacities to innovate.

- *Has been a multidisciplinary approach taken into account as a valid policy for a more comprehensive definition of the problem? Has been the problem seen from different academic perspectives?*

CBS: As I already explained, it was necessary to have a broad view. However, the different views taken on board were all within the recognised domains of economics. Moreover, we had the advantage of operating after the New Economy hypes of the late nineties of the previous century. Single definitions of the New Economy could be avoided. (New Economy means more economic growths, or absence of the business cycle, or e-commerce would take over overnight). The New Economy was primarily seen as a force that was active throughout the entire economy, sometimes immediately visible, in other cases operating as an undercurrent.

PROJECT DEFINITION: METHODOLOGY & SOURCES

- *The domain of **methodologies and sources** is meant to highlight the background data and sources of the process. Is there a particular agreement among the partners or is the process based instead on commonly accepted data and methodologies?*

CBS: Our approach was inspired by an academic interdisciplinary perspective, and resulted in a global model, being the framework to structure the

publication. The framework distinguished different modules that suggested different types of useful indicators. Then we checked whether there were such indicators that could be quantified on a regular basis. We referred to official data sources as much as possible.

- *How much did you use those official sources and how much were you forced to accept the use of other sources?*

CBS: For the key indicators we have used official sources as much as possible; we have a success rate of about 90 percent. For auxiliary indicators we have also considered other sources, as here the quality criteria were less strict; also one-shot studies were used to highlight certain phenomena. CBS and STATFIN could agree in most cases on the choices on the key indicators.

- *Which are the other sources?*

CBS: The other sources were private sources (as far as freely available) and individual studies about certain phenomena that could be found on the Internet.

PROJECT DEFINITION: QUALITY CRITERIA DETERMINATION

- *What about the agreement on **quality criteria**?*

CBS: There was not very much interaction about quality criteria. There was no discussion from the very beginning and, as CBS, we were expected to come up with results and others just responded. Moreover, the partners had to work simultaneously on their work packages. CBS could not wait until others had reached some conclusions on quality criteria. Moreover, resonance of indicators within the framework of benchmarking is a difficult issue as it is left to the users to interpret the figures in their own fashion. The benchmark indicators can only produce warning or bliss signals that could help policymakers to reflect on the right issues, but they cannot be

decisive as to how well an economy is performing given its particular historical context.

PROCESS DEVELOPMENT: PARTICIPATIVE DECISION-MAKING

- *The second area is about the **process development**. We talk about **participation in decision-making**. What kind of organisational culture is present inside CBS, in terms of discussion?*

CBS: We have quite some people within CBS that worked on this publication, like project managers and their co-workers. They had regular discussions and freedom to come up with suggestions. First I searched for acceptance from people within CBS. However, it is accepted that after an exchange of views the one who is in charge takes a decision.

- *'Participative decision-making' is more about participation, but even if NESIS is not going a lot further, is the publication able to eventually redesign itself and take into account new emerging issues and include eventually new indicators or change the existing ones?*

CBS: In principle it is quite possible, but it is also time consuming so we cannot change everything all the time; nonetheless new indicators can be added. The normal procedure would be having some incremental changes and an occasional partial re-design. However, we have learnt that such changes require ample efforts to implement them. Therefore, it is necessary to confront those who wish changes with the costs involved.

- *And now is there participation and agreement with STATFIN?*

CBS: STATFIN is a partner in the NESIS project but also in this work package. I think that STATFIN has played an essential role, especially in giving good comments about what we were doing, also in details. Changes and improvements have been done as a direct consequence. Decision-making has been based on open discussions.

PROCESS DEVELOPMENT: CONTEXT-BASED FLEXIBILITY

- *Was the framework rigid? In the sense of the publication, what can you say about the **flexibility and the capacity of taking into account those emergent issues**, which cannot be foreseen in advance?*

CBS: In the beginning I gave presentations at different workshops of NESIS where I presented my ideas, especially about the framework and the structure of the publication but this never led to very strong exchanges of views. In general what I have presented has been accepted. In the beginning there was quite some flexibility of course but then I must say that a matter of wait and see. Of course, the further you come down the road, the less flexibility there is because it takes a lot of efforts to implement changes. In the middle part there was some flexibility in the sense that we changed indicators because of the comments from partners or from participants to the IDWG meetings.

PROCESS DEVELOPMENT: COMMUNICATION AND TRANSPARENCY

- *Talking about **communication and transparency**, have you ever considered the existing **uncertainties** and the communication of them to the public, so that citizens can be aware of possible weaknesses and not getting the idea of perfection?*

CBS: Yes, in principle we show that the conceptual problem area is much greater than we can express in indicators. We made a gaps report for the remedial programme we're working on. In the text, we have to indicate where the limitations are.

- *Of course many indicators are widely accepted. Nevertheless, they sometimes show only given impacts. But **do they consider the negative effects of ICTs**, which can come back from their implementation? So, are the uncertainties linked to those unclear aspects being considered, such as health and environmental effects.*

CBS: No, I must say that officially there is the sustainability and stability aspect, but there is no work package that has done work on it

- ***Is the risk which is inside the use of those ICTs being considered?** From one side there is the economic growth coming from the use of new technologies, from another side there are negative effects in the sense of cybercriminality, interactions between governance, risk and ICT, issues*

such as identity management, privacy, health and environmental effects, and many other aspects, which can cause a decrement of quality of life and also greater expenditure damages, and their management and reparation.

CBS: There is something of social inclusion, but the overriding aspect of the Lisbon Summit was the risk of losing the game internationally (especially vis-à-vis the USA and Japan). There is a strong concern about technological development. And that means that there are leaders and followers, losers and winners. The risk considered is only this one. I understand that there are many other aspects not considered that much. But the overriding idea is linked to competition.

- *Should we shift completely to ICTs or should they constitute a sort of addition to traditional approaches in e-Governance, e-business etc. **Should an integration of different kind of aspects be possible?***

CBS: Every technology has its weaker points and we first of all we would like to use the advantages of ICT. It is clear that the further we come down the road of applying ICT, the technology itself becomes an enabling and facilitating factor in realising new ideas about products and services. One author predicted that about 40 percent of all business will be affected by chain-oriented e-commerce, with substantial differentiations between sectors. That means that there is still place for a lot of activities that are already in full swing in the old economy. Sometimes there will be some overshooting, but I am quite sure there will new equilibria coming up. Italy's comparative economic position shows that it is strong in the old economy but weak in the new economy. You may say that if the Italians are happy about it, why worry. But unfortunately, the forces of globalisation cannot be ignored as they may undermine the old economy as well. Most likely, the response cannot be reinforcing the old economy but taking the new economy on board in an innovative way.

- ***Should we consider and communicate the existing uncertainties so that the public is not driven to believe in the dogmas of ICT?***

CBS: I do not think that at the moment this is the biggest problem. The New Economy is emerging and we are not at the point of defining the optimal situation. The biggest risk is now that we miss the boat of reaching the Lisbon objectives. Although I see the usefulness of developing indicators that highlight the risks of ICT, I do not believe that for the public in general ICT is a dogma. It is just a newly emerging technology. During the ascending phase of the wave competitive leadership is crucial for who will benefit most in financial terms. In other cases ICT can lead to better or more cost-effective services, irrespective of who made the invention. As soon as a certain degree of saturation has been reached, also ICT will be taken for granted and new hot items will appear.

□ *The uncertainty is then referred to **the risk of missing the Lisbon boat...?***

CBS: Yes, but that's not something included in the project. The indicators have limitations and cannot give a complete picture of what's going on. When we talk about the uncertainties inherent in the project, we are very open and have nothing to hide.

□ *So, I should consider a strong awareness, but only in a methodological sense, for which uncertainties are shown...*

CBS: Yes, and of course many things are based on expectations about ICT, we just measure what happens, but we focus more on the economic side and on the innovation side according to Lisbon goals. Of course you could have had a more social approach, considering the problems of people. They are not denied, but they are not strongly focused on, at least not in the statistical publication. The report of the University of Bath goes into the issue of social inclusion (or the lack of it).

EXTERNAL PARTICIPATION: STAKEHOLDERS' PARTICIPATION

- *We already talked about participation but in the last area we have to detail **what kind of participation has been considered**. Where are we now and where can we go in this last part of the project?*

CBS: We have had some influence by external people through the IDWGs, but they were a small group of external people. At the final conference we will have a wider response I hope, but we have to wait and see about the acceptance of the statistical publication by different groups, we have not any intensive interactions with potential users' groups at the moment.

- *Is it possible to set up a group of discussion right now?*

CBS: In principle it is possible, we have thought about it, but I think the means are insufficient, let alone the available budget. The means that CBS had got were too limited to include all of this. Moreover, there is no time left.

EXTERNAL PARTICIPATION: TESTING AND REVIEW BY FINAL USERS

- *About the **testing and final review** by final users, did you tell me once that the statistical publication will be reviewed when published, but only ex-post?*

CBS: Yes, I did. As CBS, we hope to get the chance to continue updating the publication and to include the new member e countries as well. It would a pity if others start inventing the wheel, while CBS has the databases to come to relatively quick results. In this process reviewing and interaction with client groups would be important.

- *Is there something you would change if you were able to start from the beginning?*

CBS: I think I would like more discussion in advance before starting and more consensus s about what were to be done.

- *So there was a **lack in negotiation**.*

CBS: Yes, there was. There could have been much more alignment from the beginning of the project. In the structure of the project the publication was a sort of separate exercise. Originally the draft publication was planned in

2002, while then the other work packages were still in progress. So there could ideally have been more integration, especially considering that the other work packages did not have to produce figures, but only conceptual designing and assessment. However, the cooperation with STATFIN, as partner in the same work package, was OK.

- *In the case of STATFIN, we found, during the previous interview, that the Finnish context was characterised by a progressive saturation of economic growth by the development of ICTs. STATFIN would like to have other technologies considered as well major, which might represent key elements for a future growth (eg. Biotechnologies, learning processes, research in other sectors).*

CBS: There has been a discussion about the knowledge economy, especially between the University of Bath and STATFIN. STATFIN wanted to adopt a broader view and consider also emergent technologies. I also opted for a broader approach but maybe not so strongly as STATFIN. For me it was clear that in technological terms the New Economy is about ICT.

- *As you see, we go back to the consideration of broader risks and uncertainties. Lisbon goals talk about knowledge-based economy, whose interpretation might be restricted to the production and use of ICTs, or instead to a focus on more possible fields in which knowledge can be developed and constitute a source for economic development and competition in the global economy. In the Finnish case, we can see that investments in ICT have already given results in terms of economic growth. Today's research and development has to look forward and find any other source for making Europe ready for the future challenges. So, even if many countries in EU have not still reached the Finnish performance in ICTs, they could develop ICTs, while at the same time have a look to the future challenges and possible emergent issues. And eventually, do not forget present and future uncertainties and risks in the terms above mentioned. Do you have any comments about?*

CBS: *The statistical publication involves the entire capacity to innovate (the knowledge-based economy) and the entire macroeconomic context. ICT is a pervasive technology penetrating the entire economy. Therefore, you need the entire modern economy to apply the possibilities of ICT through innovation. This is not a matter of having an ICT sector alone. The subject of the NESIS project is about ICT. However, there is a tendency to focus on the knowledge-based economy in general and involve other technologies as well. This is important. Therefore, new projects may pick this up. Finland has an advanced position in ICT but may also be vulnerable as it is based on a strong export position in ICT, and therefore dependent on a highly dynamic market. It like sports: reaching the top is difficult, but staying at the top is more difficult. NESIS remains relevant also for Finland.*

References

Funtowicz S.O. and Ravetz J.R. (1990), *Uncertainty and Quality in Science for Policy*, Kluwer Academic.

Funtowicz and Ravetz 1992, 1993, 1999, Ravetz 1999 - *Post-Normal Science*, mimeo

Mintzberg, Ahlstrand, Lampel - *Strategy Safari* (Financial Times Prentice Hall, 1998).

Karl R. Popper, - *The logic of scientific discovery*, 1968

P. Aghion; P. Howitt - *Endogenous Growth Theory* (The MIT press, Cambridge Massachussets, London, England, 1998)

B. De Marchi, S. Funtowicz & Â. Guimarães Pereira - *e²-Governance: electronic and extended*

Commission on Global Governance (1995) - *An overview of Our Global Neighbourhood* - The Report of the Commission on Global Governance, Oxford, Oxford University Press.

CEC (Commission of the European Communities) (2001) European Governance - a White Paper, COM(2001) 428, Brussels, 25.7.2001. See also the web-site: http://europa.eu.int/comm/governance/white_paper/index_en.htm

Laurence Romani - *Management style in Sweden: teamwork and empowerment*; Stockholm School of Economics (http://www.sweden.se/templates/Article____6934.asp)

http://www.ioew.de/governance/english/veranstaltungen/Summer_Academies/SuA2Mayntz.pdf

http://europa.eu.int/comm/governance/governance/index_en.htm

<http://www.e.finland.fi/netcomm/news/showarticle.asp?intNWSAID=20614>

Elizabeth Muller, *From e-government to e-governance: the OECD experience*; e-government project OECD - SitExpo 2004; 18-21 February 2004, Casablanca, Morocco

Maurizio Sajeve - *Notes of environmental economics* - University "La Sapienza" of Rome, Italy, 1998

Maurizio Sajeve, *Ecolabelling: a tool for environmental protection and a competitive strategy for companies. Case study in Finnish Pulp and Paper Industry*, University of Jyväskylä, Department of Environmental Management, Finland, 1999

Teodoro Dario Togati - *On the stability of the New Economy*, University of Turin, Italy, 2004

Parminder Singh Sahota, Paul Jeffrey, Mark Lemon - *Improving decision making and embracing sustainability agenda*, International Ecotechnology Research Centre, Cranfield University, U.K., 2004

Robert J. Barro - *Economic Growth in a cross section of countries*, The Quarterly Journal of Economics, Vol. 106, No 2 (May, 1991), 407-443

Marian K. Deblonde, *Economics as a Political Muse*, 2001

Economic Dictionary, Zanichelli, Il Sole 24 Ore

Mission of the JRC

The mission of the Joint Research Centre is to provide customer-driven scientific and technical support for the conception, development, implementation and monitoring of European Union policies. As a service of the European Commission, the JRC functions as a reference centre of science and technology for the Union. Close to the policy-making process, it serves the common interest of the Member States, while being independent of special interests, whether private or national.

