Analysis of empirical surveys on organisational innovation and lessons for future community innovation surveys

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Analysis of Empirical Surveys on Organisational Innovation and Lessons for Future Community Innovation Surveys

“Surveying Organisational Innovation on a European Level – Challenges and Options”

Final Report

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1 Executive Summary

1.1 Overview

The impact of organisational innovations on the performance and competitiveness of firms has been increasingly recognised in recent years. Organisational innovation is seen to be important for two main reasons:

- That there are new organisational forms or management methods that are superior to older forms or methods and that the use of these will increase productivity, improve competitiveness and enhance profits. Organisational change thus constitutes an innovation of its own right.

- That there are complementarities between organisational innovations and technological innovations. This line of argument implies that an organisation may well have to adapt its structure to meet the needs of new technologies. Here, organisational innovation takes on a supportive role.

In addition organisational innovation may well impact upon the skill development of the workforce and working conditions, and, although as yet unproved, may be a major contributory factor in explaining the European productivity paradox. Yet, despite the importance of organisational innovation, innovation surveys and statistics still tend to focus mainly on R&D-based technological innovations in products and processes. There is currently no European-wide mapping of innovations which includes organisational innovation.

To address issues of how to better gather data on organisational innovation, the study “Analysis of Empirical Surveys on Organisational Innovation and Lessons for Future Community Innovation Surveys,” was commissioned by DG XIII-C of the European Commission. The study had two major aims:

- The scattered experiences with surveys on organisational innovations in Europe had to be collected and summarised, both with respect to methodological and application success factors, in a systematic way. 1

- These experiences were to form the basis for the development of methodological approaches to examining organisational innovation Community-wide, in a comparable way and taking into account the needs of potential users.

Particular attention was paid to how the gathering of data on organisational innovations could be part of future large-scale, representative surveys on the Community level or be integrated in the Community Innovation Survey.

1 A brief overview is provided in annex, the full description is available as a separate document: Fraunhofer ISI et al, Descriptions of Selected Surveys on Organisational Innovation, working document in the framework of CIS98/191, Karlsruhe, May 2000
After examining a variety of existing empirical surveys of organizational innovation in Europe, the United States, and Japan, the study team developed six key criteria to assess proposals for improved organizational innovation data gathering at the Community level. These criteria focussed on the validity, comprehensiveness, links to technical innovations, links to performance measurement, stakeholder acceptance, and cost.

These criteria were used to evaluate the strengths and weaknesses of five different approaches for future Europe-wide surveying of organisational innovations.

(1) Amendment of the Community Innovation Survey (CIS) by a single question to identify a third category of (organisationally) innovative firms;

(2) Extension of the CIS-Survey by questions aimed at the role of organisational innovations in supporting or enabling product innovation;

(3) Comprehensive integration of organisational innovation into the Community Innovation Survey (CIS);

(4) Harmonisation of existing regular surveys in European countries;

(5) Development and implementation of an independent survey on organisational innovations.

The study team recommends a combination of option (2) – extending the CIS survey with questions aimed at the role of organisational innovations in supporting product innovation, and option (4) – the harmonisation of existing regular surveys on organisational innovations.

1.2 The Nature of Organisational Innovations

Organisational innovations are of two different kinds (although these usually interrelate): Structural innovations encompass responsibilities, accountability, command lines and information flows. They change the number of hierarchical levels, the divisional structure of functions (development, production, etc.) or the separation between line and support functions. Managerial innovations affect the operations and procedures of the enterprise such as the specifications of the responsibilities, the contents of commands and of information flows and the way they are dealt with. They concern speed and flexibility of production and the reliability of products and production processes.

Organisational innovations appear at three different levels: Some new organisational solutions are appropriate to particular departments or functions of a company (sub unit level). Other organisational innovations relate to the overall structure of the company or the functional principles of the company as a whole (organisational level). At a third level innovations may impact upon the company’s relation-
ship with its environment, particularly its interaction with other organisations (supra-organisational level).

Figure 1 gives some example of organisational innovations and their position in our conceptual framework.

**Figure 1: Classifying Organisational Innovations**

<table>
<thead>
<tr>
<th>Structural Innovations</th>
<th>Organisational Level</th>
<th>Supra Organisational Level</th>
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</thead>
<tbody>
<tr>
<td>Team Work</td>
<td>Cellular Manufacturing</td>
<td>Joint Venture</td>
</tr>
<tr>
<td>Quality Circles</td>
<td></td>
<td>Virtual Enterprise</td>
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<td></td>
<td></td>
<td>R&amp;D Cooperation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Managerial Innovations</td>
<td></td>
<td>Just in time</td>
</tr>
<tr>
<td>Simultaneous Engineering</td>
<td></td>
<td>Single Sourcing</td>
</tr>
<tr>
<td>Continuous Improvement</td>
<td></td>
<td>Supply Chain</td>
</tr>
<tr>
<td>Preventative Maintenance</td>
<td></td>
<td>Management</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Customer Quality Audits</td>
</tr>
<tr>
<td></td>
<td>TQM</td>
<td>DIN ISO 9000</td>
</tr>
<tr>
<td></td>
<td>KANBAN</td>
<td>MbO</td>
</tr>
</tbody>
</table>

The scope of organisational innovations is stratified:
- over three levels (sub unit / organisation / network of organisations)
- over two kinds of organisational innovations (structural and managerial innovations)

1.3 Challenges in Surveying Organisational Innovations

The study team analysed existing surveys of organisational innovations in most of the European economies, the US and Japan. This analysis was conducted in two stages. The first stage took a wide view, considering 20 surveys and explored their samples, methods and results. In the second stage, five selected surveys were considered in detail. The analysis demonstrated that when surveying organisational innovation it is necessary to be aware of a number of challenges:

- The complexity of organisational innovation is reflected in the scientific discussion of the issue. There are many theories of organisation and there are many different explanation of why and how organisations change. They direct the attention of researchers and policy-makers to different aspects of the phenomenon of organisational change. **Empirical research strategies must therefore be designed to allow the theory-based interpretation of empirical data.**

- Given the long lifetime of organisational principles and management methods compared to products and technological processes, it is much more crucial here to distinguish between the fact of change itself and the actual level of organisational innovation achieved by an organisation. The underlying question is whether an organisation’s performance or success relates more to the appropriateness of its organisational structures and management methods, or whether per-
formance and success relate more to the firm changing these structures and learning from this process. **Therefore it is not sufficient to ask simply whether change has taken place or not.**

- There are no common definitions or indicators of organisational innovation. Therefore it is not sufficient to ask for pre-defined organisational concepts (such as delayering or cellular manufacturing) but it is necessary to asking for features of an organisation (such as the number of hierarchical layers, the span of control or the range of tasks at a certain level). **It is important to look beyond the catchwords** for the concrete organisational concepts, in order to avoid different understanding of the same terms. Also, it must be considered that there could be **big differences in the internal diffusion of a new organisational principle.**

- Best practice in organisational innovation is context dependent. There is no one best practice. At any moment in time for any given organisation there is an optimal organisational form or set of management methods that if used by the organisation will yield the greatest benefit. What is best may vary according to size, market, objectives, ownership, national environment etc. If it is accepted that there are such differences, any simple analysis of whether firms have or have not adopted a specific organisational innovation is only of limited value.

The review of surveys on organisational innovation shows that together with the rising importance of this issue in industrial, political and scientific debate, the number of large scale surveys aiming to investigate the diffusion, determinants and impact of organisational change at company level also rose. However, the approaches and administrative backgrounds are diverse as well as the respective prime goals of the surveys. Many are of a purely scientific nature. Few can claim a certain national or even European visibility and policy impact. Although almost all surveys address the currently most discussed elements of organisational innovation, the diversity of questionnaires, question wording and concepts as well as sample designs do not suggest that cross-national comparison is possible for the time being. The differences regard the following aspects:

- **Diversity of the target groups** of surveys: Of particular importance in this field is the decision on the sectors targeted. With similar market, technological, and structural backgrounds (sector-specific surveys) common understanding and appropriateness of questions are easier to achieve. Furthermore the targeted survey entity or unit is important. The relevance or form of many organisational innovations changes with the size of the entity addressed by the survey. Whereas some issue in organisational innovation only relate to multi-establishment sites the majority of new organisational forms are still restricted to a single establishment of the same company.

- **Diversity with respect to the person addressed within an organisation**: The typical target group of surveys on organisational innovation is top management,
although they will only rarely be the ones to actually fill the questionnaires in. Thus, questionnaires will often undergo an odyssey within an organisation or be – at least partly – answered by a non-specialist. When a specialised survey e.g. on technological innovation tries to co-address other issues, there is a risk that the validity may suffer. The R&D manager’s characterisation of managerial practices and organisational structures on the shop floor will differ from shop floor reality.

- Diversity when ascertaining the impact of new organisational practices: Survey methods range from not asking for information on the effects, over asking for perceived impacts, to the application of specific (objective) performance indicators. Whereas with perceived impact analysis there is a risk that positive effects will be overestimated, objective investigation has to decide whether to follow a before-after approach, or whether to compare establishments with and without organisational innovations.

To conclude this consideration of challenges and requirements when surveying organisational innovations, taking into account that "feeding" policy decision-making would be a major aim of any large scale monitoring of organisational innovation, and considering that at the same time there are further stakeholders associated with such surveys, different possibilities for establishing a Europe-wide survey on organisational innovation should be evaluated according to the following partly contradictory set of criteria:

- **Validity of results** (theory-based questions, ensuring common definitions by looking beyond catchwords, appropriateness of target groups and addressed persons, etc.)

- **Comprehensiveness of results** (addressing the various aspects of organisational innovations, information on the levels of use as well as changes in use, not only asking questions as to whether the organisation uses a new organisational principle but asking for the extent to which it is used)

- **Links to technical innovations** (exploring the prior technology and what technological innovations occurred in the survey period, so that complementarities between these may be explored)

- **Links to performance measurement** (containing considerable detail on organisational performance)

- **Stakeholder acceptance** (by firms addressed, industry as a whole and the various industrial associations, trade unions, researchers etc. with respect to respondent burdens, accordance with the respective interests etc.)

- **Reasonable cost**
1.4 Strength and Weaknesses of Different Approaches for Future Europe-wide Surveying of Organisational Innovations

With a view to developing methodological approaches to examine organisational innovation Community-wide we distinguished, discussed and evaluated five approaches:

(1) **Amendment of the Community Innovation Survey (CIS) by a single question to identify a third category of (organisationally) innovative firms**

The most obvious and apparently easiest way to survey organisational innovation on the European level seems to be by simply adding a question to the existing CIS questionnaire, thus allowing to distinguish from technologically innovative firms with respect to products and processes a third category of organisationally innovative firms. Such a question might read: "Between t and t+1 has your enterprise introduced any organisational innovations? (Note: organisational innovation is the adoption of new organisational structures or the application of new management instruments either within a sub-unit of the firm, within the firm as a whole, or in the firm’s co-operation with other companies)". Due to severe methodological problems with such a question this very restricted attempt has not been undertaken in the surveys we examined.

The technical validity of such an approach is problematic. Whereas the sample design and representativeness of CIS sets a high standard the validity of this kind of question is to be questioned. A comprehensive mapping of the diffusion of organisational innovations in Europe would not be achieved. Links to performance measurement could not be established. Although stakeholders might accept the approach on the grounds of easy implementation at low cost, the data gathered would be of very limited use.

(2) **Extension of the CIS-Survey by questions aimed at the role of organisational innovations in supporting or enabling product innovation**

This approach would add some additional questions to the CIS questionnaire. With these questions two complementary dimensions would be covered: first, by a list of relevant organisational innovation in the area of R&D and product development, the organisational dimension of the technological (product) innovation process would be clarified. Such a question might read as follows: "In the area of new product development, did your enterprise introduce any of the following organisational innovations: – cross-departmental temporary development teams – simultaneous concurrent engineering – project management methods (target costing, quality function deployment (QFD), benchmarking R&D performance, etc.) – participation of users?" Second, current CIS questions on the inhibiting and reinforcing factors in innovation would have to be adapted to refer more specifically to organisational issues.
Such an approach would be restricted to investigating the impact of organisational innovation on product innovation. A comprehensive picture of the state of the art of organisational innovation in Europe would not emerge. This approach therefore calls for a combination with option 4 or 5. However, refraining from comprehensiveness in the framework of CIS would offer the opportunity to gain valid results though with a more limited scope of organisational innovation. The question would cover selected managerial and organisational innovations, but only at the sub-unit level of the R&D or design department. The CIS context would ensure clarification of the links between organisational innovation and product innovation. Stakeholder acceptance of this approach is difficult to assess; cost, however, would be limited. For the CIS questionnaire medium scale extensions would result.

(3) **Comprehensive integration of organisational innovation into the Community Innovation Survey (CIS)**

If a comprehensive survey of organisational innovation were to be combined with the CIS survey a broad spectrum of questions, covering the full range from sub-unit to supra-organisational and from structural to managerial innovations, would have to be added. Moreover, specific items would need to be included relating to the inhibiting or fostering factors, the internal diffusion and the impact of organisational innovations.

The main attraction of this approach would be the possibility to investigate the complementarities of technical and organisational innovation. However, if this aim is taken seriously it would mean revolutionising the CIS questionnaire and approach. The questionnaire would either have to be extended very much or do without the current depth with respect to product (and process) innovation. This option does therefore not seem very realistic.

(4) **Harmonisation and extension of existing regular surveys in European countries**

Another way of achieving a European wide monitoring of organisational innovations would be if one could build on existing surveys and reach a consensus on core questions on organisational innovations. Given a certain stability of the conducting institutions and their commitment to a viable sample practice, one major task remaining beside the harmonisation of questionnaire items would be to ensure the availability of the results to the different stakeholders. Based on existing, established activities with well recognised organisations this approach has a similar head start advantage to the CIS. Particularly, relations between researchers in the area in the respective countries already exist.

This approach offers an opportunity for comprehensive mapping of organisational innovation combined with stakeholder acceptance. Due to the need for co-ordination between different partners, compromises are necessary regard-
ing validity and performance measurement. Links to technical innovations cannot be ensured but seem possible as most of relevant surveys do already address this topic, too. The cost of such an approach seems manageable.

(5) Development and implementation of an independent survey on organisational innovations

The most demanding approach would be to establish a full questionnaire survey of organisational innovation on the European level, across sectors, in parallel and complementary to CIS and to already existing national surveys. Experience indicates that despite the methodological advantages of such an approach, the actual Europe-wide realisation would be very difficult, time-consuming and costly. The technical validity of the questions could be very good. Nevertheless, even with this approach choices would have to be made. Unless the survey is conducted by an official organisation (or the response is enforced by other means) problems with sample sizes and representativeness are likely. The stakeholder acceptance is difficult to assess since effort, quality and rapid availability of results are hardly predictable. The possibility to map organisational innovation as well as to identify determinants and impact in a fairly comprehensive way would be gained at the expense of the in-depth analysis of complementarities with technical product and process innovation.

Advantages and disadvantages of the different survey approaches for a Europe-wide monitoring of organisational innovation are listed in Figure 2.

Figure 2 : Evaluation of Different Survey Approaches

<table>
<thead>
<tr>
<th></th>
<th>(1) One question in CIS concept</th>
<th>(2) Question on R&amp;D related org. innovation in CIS</th>
<th>(3) Comprehensive coverage in CIS</th>
<th>(4) Harmonisation of existing surveys</th>
<th>(5) Independent survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Validity of results</td>
<td>○</td>
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<td>•</td>
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<tr>
<td>Comprehensive-ness of results</td>
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<tr>
<td>Links to technical innovations</td>
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<td>Links to performance measurement</td>
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<td>Stakeholder acceptance</td>
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<tr>
<td>Cost</td>
<td>•</td>
<td>○</td>
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</tbody>
</table>

○ evaluation criteria well performed  ○ evaluation criteria partly performed  ○ evaluation criteria not performed
1.5 Conclusions and Outlook

The importance of organisational innovation in firm performance and competitiveness as well as their impact on skills and working conditions presents a clear case to substantially improve information on organisational innovations in Europe. The CIS can contribute to, although not fully meet, this information challenge. As a tool for innovation surveys, the CIS has many advantages. In particular it has a wide area of coverage, is internationally comparative and is repeated at regular intervals. On the other hand the CIS questionnaire is already very long and consequently the possibilities of extending it are very constrained. A simple amendment of CIS which aims to define an innovative firm simply by the fact that it implements organisational innovations, in addition to technical product and process innovations, would most likely not prove successful unless a very comprehensive question were used and all other parts of the questionnaire were adapted accordingly. But CIS III could be used to probe targeted questions concerning the effects of organisational innovation with respect to new product design. More comprehensive analyses of organisational innovation should be addressed by adopting a complementary large scale approach, possibly making use of existing regular surveys.

We thus recommend that modest organizational innovation modifications to the CIS be coupled with support for the harmonization of existing, separate, but more comprehensive surveys. Experts responding to the panel review of our findings and recommendations supported this proposal. It would provide balanced and improved perspectives on organisational innovations in Europe, with least cost and burden to the CIS survey process and to industry (particularly, when compared to an additional independent survey). As quick information is desirable the above proposed harmonisation could start as a feasibility or experimental study with a limited country coverage and include the review of already available (although scattered) results from existing surveys as a first deliverable (organisational innovation observatory study).
2 Introduction: Study Approach

Although it is commonly accepted that organisational innovation plays a major role in improving an organisation's and consequently a nation's competitiveness, organisational issues are rarely covered in national statistics. This is not due to denying the importance of these questions per se. Rather there are serious barriers to including indicators of organisational practice in the processes of gathering empirical data. In contrast to the long tradition e.g. of elaborating valid indicators for R&D there has been much less effort invested in the field of enterprise organisation.

The second Community Innovation Survey (CIS II), launched in spring 1997, did not address the matter. The questionnaire and the methodology are based largely on the revised Oslo manual. The Oslo manual claims (a) knowledge in all its forms plays a crucial role in economic progress, (b) that innovation is at the heart of the emerging knowledge-based economy, and also (c) that innovation is a much more complex and systematic phenomenon than was previously believed. It states that an enterprise can make many types of changes to its methods of work, its use of factors of production and its types of output which improve its productivity and/or financial performance, and that R&D is one important but not the only source of the changes. However, the manual does not provide appropriate guidelines on how to survey organisational innovation.

Consequently, it was felt during the preparatory meetings in the context of CIS that too many questions needed to be clarified before a Community-wide survey could tackle organisational innovation. The need to improve the empirical basis for research and policy-making continues, however. A number of initiatives have been undertaken by independent researchers whose experiences – as the call for tender stated – need to be taken into account in the preparation of future Community innovation surveys.

Against the above background and on the basis of a broad understanding of organisational innovations, particularly taking into account their interaction with product innovation and technology diffusion as well as their potential impact on industrial performance, the study „Analysis of Empirical Surveys on Organisational Innovation and Lessons for Future Community Innovation Surveys“ (Scientific Follow-up of the Community Innovation Survey (CIS) – Lot No.8) was commissioned by DG XIII-C of the European Commission. It has two major aims:

- The scattered experiences with surveys on organisational innovations in Europe have to be collected and summarised, both with respect to methodology and application in a systematic way.
- The experiences should form the basis for the development of proper, possibly alternative or complementary methodological approaches to examine organisa-
tional innovation Community-wide, in a comparable way and taking into account the needs of potential users.

Particular stress had to be put on the question of whether and how the gathering of data on organisational innovations can be part of future large-scale, representative surveys on the Community level or be integrated in the Community Innovation Survey.

This project did not aim to provide a review of the findings of surveys on organisational innovations. It tries to draw a line between the implementation ("technical" aspects) of the questions ("content" aspects) and the results/answers enabled ("use" aspects). This implies analysis at both a survey as well as on a question level. A guiding question is:

- **What approaches and questions related to organisational innovations work for what purpose or research problem?**

The study ran from March 1999 to May 2000. It was a joint project of five research organisations (see cover page) all of whom have own experiences of conducting large scale surveys in the field of innovation. Figure 3 gives an overview of the tasks, deliverables, and their timing.

![Figure 3: Study Approach and Schedule](image)

**Task 1:** Conceptual Analytical Framework and Review of Existing Surveys

**Task 2:** Documentation and Assessment

**Task 3:** Methodological Development

**Task 4:** Discussion and Lessons

**Task 5:** Recommendations for Survey Implementation

**Task 6:** Workshop Preparation

In the following, we shall point out the relevance of organisational innovation as a subject for large scale monitoring and our conceptual framework for analysing the issue. This framework is applied to the review of a number of recent surveys which

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2 Acknowledgement: This paper is based on several contributions of the project partners. There are internal papers (Stoneman 1999, Bellini/Bonaccorsi/Daraio 1999, Nylund et al 1999) of which parts have been included. The papers can be provided on request.
addressed organisational innovation to different degrees and with diverse approaches in Europe, the US and Japan. The results are described in chapter 3. This chapter gives a brief overview of current survey practise. Finally, five options on how surveying organisational innovation could be organised on the European level within and beyond the Community Innovation Survey are presented.

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3 A brief overview is provided in annex, the full description is available as a separate document: Fraunhofer ISI et al, Descriptions of Selected Surveys on Organisational Innovation, working document in the framework of CIS98/191, Karlsruhe, May 2000

3.1 The Relevance of Organisational Innovation

The study of organisational innovations is more recent than the study of the more commonly analysed technical (product and process) innovation. In recent years, organisational change and its links with company performance, technology diffusion and innovation capability has become the subject of increased research and policy concern. Attention to models of "Lean production" in Europe, America, and Japan (Womack, Jones and Roos, 1990) promoted considerable awareness in policy discussions of the importance of organisational issues in fostering enterprise and industry competitiveness. However, even prior to this, there were several other studies highlighting the importance of organisational innovations for international competitiveness. For example, the much discussed “fourth industrial revolution” (or information-driven revolution) seems to be deliberately organisational in nature. It should be noted that in his seminal work Schumpeter classified three of the main types of innovation as being innovation in products, innovation in processes and innovation in management methods. The existence of management innovations has thus long been recognised.

3.2 Impact Patterns of Organisational Innovations

The importance of organisational or management innovations historically arises from two main beliefs

− That there are some organisational forms or management methods that are superior to older forms or methods and the use of the better forms or methods will generate for the organisation higher productivity, improved competitiveness, greater profits (if in the market sector) or perhaps some other benefits to the stakeholders in the organisation.

− There are complementarities between organisational innovations and technological innovations. This line of argument goes back a considerable way. For example in the early 1960’s literature on computerisation, it was commonly argued that if an organisation was to benefit from computers the organisation may well have to adapt its structure or organisation to meet the needs or characteristics of the technology. More recently the complementarity between technological innovation and organisational form has been emphasised by Milgrom and Roberts (1995). The organisation of the R&D and product design processes also matter with respect to the ability to come up and be successful with new products (Lay 1999, Bonacors 1996).
An understanding that product, technical process, and organisational innovation (and possibly service innovation as well) are important activities in their own right for improving the competitiveness and the success of a firm seems sensible against such a background. In addition, complementarities work two ways. There is also often a need for new or adapted technology to make organisational innovation work. However, the discussion of innovation is often biased towards R&D-based product innovation, thus at best reducing organisational innovation to a supportive activity.

The body of the OSLO manual for example concentrates on new and significantly improved products and processes. It does not consider organisational changes as an innovation activity in itself. The manual recognises that purely organisational innovation is widespread and may result in significant improvements in an enterprise’s performance. "However, since there has been relatively little practice experience on this topic, it is currently not dealt with in the study.” The Oslo Manual defines organisational evolution only as activities that support or are complementary to technological innovation.

### 3.3 Context Dependency of Organisational Innovation

The above mentioned arguments suggest that at any moment in time for any given organisation there is (may be) an optimal organisational form or set of management methods that if used by the organisation will yield the greatest benefit to that organisation or its stakeholders. Over time new sets of management tools or new organisational possibilities may be made available and as they become available that which is optimal may change. In such a scenario one explores organisational innovation or innovation in management methods in order to observe whether, why and how firms are moving to the best forms or methods and with what impact.

Such an approach does not necessarily imply that the same organisational form or set of management methods are the best for all firms. What is best may vary according to for example size, market, objectives, ownership, national environment etc. To conclude: There is no *one* best practise in organisational innovation but different best practises.

Accepting that there are such differences across organisation in what is best any simple analysis of whether firms have or have not adopted a new management method or organisational innovations in itself is only of limited value. Clearly such analysis will provide a count of the number of adopters but:

- It will not indicate whether the firms that have not adopted have not done so because the innovation is inappropriate. A head count therefore of the number of adopters gives no indication as to whether this number is “good” or “bad”.

− It will not indicate whether the adopters of the innovation have adopted the “best” or whether they have adopted a sub optimal innovation.

3.4 Organisational Innovation in Organisation Theory

The complexity of organisational innovation is reflected in the scientific discussion of the issue. Organisational innovation seems one of the most difficult topics in organisation theory and empirical analysis. There are many theories of organisation and almost all have a different explanation of why and how organisations change over time. Consider the following alternative explanations:

− There is a structural fit between the organisation and the external environment. Change is determined by the effort to reduce misalignment of organisation structure with respect to parametric variations of the environment, particularly its degree of uncertainty (contingency theory).

− Organisational structure is ultimately determined by the need to minimise production costs and transaction costs. Hybrid forms emerge when pure organisational forms (arm’s length contractual relations or hierarchical integration) are no longer able to deal with changes in asset specificity or environmental parameters. Organisational change is generated by evolutionary pressures that select those forms that economise total costs in the long run (transaction cost approach).

− Organisations are collections of individual contracts. Under conditions of information asymmetry, contracts must be incentive compatible and induce the optimal level of effort. Optimal contracts also satisfy the requirement that parties have the interest to prefer them over their best available alternative. Changes in information sets, monitoring technology, or production technology require the adaptation of contracts. In some cases new contracts require substantial changes in the structure of the organisation, e.g. reducing the number of layers (agency theory).

− Contracts within organisations are often incomplete. The crucial point in the design of an organisation is the definition of those who have residual rights after contracts have been realised. This may change over time as a consequence of changes in the degree of substitutability of resources and in uncertainty (incomplete contract theory).

− Organisations are computational systems that collect, process, transform and diffuse information. Various hierarchical configurations of information processing systems have different properties. Changes in configurations may be induced by changes in information arrival rate, dispersion of information, information decay or the like (computational organisation theory).

− Within organisations there is a convergence of interests between member groups whose interests otherwise diverge. Organisational structures are designed to keep
all interests together. Changes in the balance of power or external legitimisation of interests may require adaptation in the structure (institutional theory).

- Organisations are collections of routines that reproduce successful action patterns, resulting from a process of variation, selection and retention under bounded rationality. Change is mainly brought about by falling performance. At another level, there may be meta-routines that control the implementation of routines and may induce change purposefully before performance degrades (evolutionary theory).

- Organisations do not change very much. They are subject to considerable inertia and are not able to escape environmental selection. The level of analysis is not change in organisations, but change in the composition of the population of organisations (population ecology).

All these theories and approaches have a legitimate claim regarding why and how organisations change. They also direct the attention of researchers and policy-makers to different aspects of the phenomenon and different levels of analysis. They suggest different answers to the question whether any observable organisational change is to be considered organisational innovation and why.

We are recalling this not for academic purposes but rather to warn against any easy interpretation of organisational innovation and any premature definition of empirical strategies. Nobody expects policy makers to make a commitment to any of these theories. However, empirical strategies must be comprehensive and forward-looking enough to allow theory-informed interpretation of data.

3.5 Definition and Indicators for the Monitoring of Organisational Innovation

It was an important task of the project to develop an appropriate conceptual framework which allows the analysis of current survey practise in a systematic way given the above described complexity of the subject. Rather than start with a strict definition of organisational innovation based on one or another organisation theory it was decided to start with a broad scope and understanding.

Today’s discussions and empirical findings on industrial innovation call for a comprehensive understanding of innovation. Figure 4 provides a simple model of the range of innovation areas relevant in a company. We define four fields described through a two by two matrix: process/product on the one hand and physical/intangible on the other. There are of course several interactions between the four fields. Taking this into account the model forms a general background for the project. We concentrate on the field of organisational innovations understood as largely intangible process innovations.
When discussing the best ways of monitoring the diffusion and impact of organisational innovations, it is important to look beyond the catchwords for the concrete organisational principles and concepts. Or in other words: What is an organisational innovation must be thoroughly defined before starting any empirical investigation. Thus, we note (see also Figure 1 page 3):

(a) Organisational innovations may be of two different kinds (although both usually interrelate): first, they may be structural innovations, affecting the organisational structure of the enterprise. These determine and change the distribution of responsibilities, accountability, command lines and information flows. They may change the number of hierarchical levels in an organisation, the divisional structure of functions (development, production, marketing, etc.) or the separation between line and support functions. Secondly, organisational innovations may be managerial innovations, affecting the operations and procedures of the enterprise. Managerial innovations change the operations of the firm within its structure, i.e. the actual specifications of the responsibilities, the contents of commands and of information flows and the way they are dealt with. They may concern speed and flexibility of production (e.g. 'just-in-time' systems) or the reliability of product as well as production processes (e.g. 'total quality management', 'semi-autonomous work groups'). These two areas cover the two fundamental questions of organisational theory: how is a complex task decomposed into sub-tasks, and how co-ordination between sub-tasks is achieved. The first question relates to the division of labour, i.e. how the overall
task of running a business is subdivided. Managerial practices can be thought of as *co-ordination devices*.

(b) Organisational innovations occur on different levels: the organisational innovations or innovative organisational principles and concepts currently discussed have different scopes and concern different aspects of the firm. It is therefore important to systematise the concepts. The structure we propose is threefold and refers to the different levels of a firm which the specific organisational measure or concept is addressing. There are new organisational solutions for particular departments or functions of a company (sub unit level). Other organisational innovations concern the overall structure of the company or the functioning principles of a company as a whole (organisational level). The third level innovations target the relationship of the company with its environment, particularly the interaction with other organisations (supra-organisational level) (Perich 1993).

To conclude, the typology of organisational innovations used in this project distinguishes between structural and managerial on the one hand and three levels of organisational innovation on the other. See the figure 3 below. Although the categories of structural and managerial innovations may well overlap this framework can be used to roughly categorise the organisational innovations covered by the surveys reviewed. Within this Figure examples of a number of organisational/managerial innovations are introduced. However, the list so introduced is by no means comprehensive. For example at the sub unit level one might wish to include performance related pay, at the organisational level one might want to include Business Process Re-engineering, and at the supra-organisational level one might want to include issues such as electronic messaging. Many more such additions could be included.

This is in fact one of the problems of any approach to organisational innovations that names any particular innovations. It is extremely difficult to be comprehensive as to a list of innovations. Thus although one might produce a long list of innovations and ask respondents which if any have been adopted, if some are missing from the list than the responses might not accurately reflect the extent of organisational innovation taking place. Other empirical strategies are therefore also taken account of, e.g.: organisational changes versus the actual organisational form; the reference to (fixed) organisational concepts (“list” of organisational innovations) versus the identification of organisational features (“properties” of the organisation); the means of implementing the process of organisational change (innovation projects).
4 Current Survey Practice

Although our review of surveys on organisational innovation is by no means complete it shows that together with the rise of this issue in industrial, political and scientific debate the number of large scale surveys which aim to investigate the diffusion, determinants and impact of organisational change at company level has risen recently. However, the approaches and administrative backgrounds are diverse as are the respective prime goals of the surveys. Most are of a purely scientific nature. Few can claim a national or European visibility and policy impact.

4.1 Classification of Existing Surveys

A very rough summary and tentative classification would be as follows:

- With the exception of the Nordic countries’ Flex-surveys (first conducted by NUTEK, Sweden, and predominantly addressing flexibility issues and their consequences, NUTEK 1997) there is yet no comprehensive national (in the sense of governmentally backed) attempt to regularly monitor organisational change in industry and/or services. Some countries have added a few organisation-related questions or items in their CIS II surveys, e.g. the UK. But these are neither well integrated with the existing harmonised CIS questionnaire on technical innovation nor cover the issue in a very comprehensive way.

- Out of evaluations of public programs aimed at the modernisation of production in some countries a tradition of regular surveys of manufacturing industries has developed. Examples are the Georgia (Youtie/Shapira 1997) and the ISI (Lay/Shapira/Wengel 1999) manufacturing surveys in US and Germany which are conducted bi-annually and, in 1999, for the first time use a largely harmonised questionnaire. They are basically run at the institutes’ own initiative and provide a broad range of data for different purposes in the context of scientific research as well as policy and industry consultancy projects. Organisational innovation is a major concern in the questionnaire beside technological innovation and several performance indicators.

- A third category of surveys are those which have a largely scientific origin but do not only serve one specific project or scientific interest but rather aim to build a data pool which is available to other researchers as well. The Nifa-Panel of the University of Bochum in mechanical engineering among others belong to this group and covers organisational innovation to a considerable extent. However, typically such surveys are restricted to certain sectors or regions (more comprehensive approaches usually stretch the limits of science funds and schedules).

- Numerous surveys exist which were developed and conducted as part of specific research projects. Though they sometimes use interesting questions or operation-
alisations of organisational innovation they usually only cover a relative small number of companies in a limited area of the economy.

Finally, there is already a considerable number of surveys which covered different countries with the same questionnaire. Aimed at international comparison of the implementation of new organisational principles and often attached to a certain scientific school or discipline these surveys stem from co-operations of a limited number of (university) research institutes which managed to attract appropriate funding. The survey on "Organisational Innovation and Performance in the 1990s, INNFORM (Ruigrok et al 1999, Whittington et al 1999)" belongs here. Despite previous intentions, in some cases, none of these groups has yet implemented a second round of surveys. Results are usually found in scientific journals and are rarely designed to support decision-making. The EPOC survey initiated and funded by the European Foundation in Dublin however was directly aimed at feeding the political and industrial debate on employee involvement and organisational change (EPOC 1997).

A special case are (mostly commercial) surveys aiming at benchmarking among the participating firms. The project looked at a number of such activities namely the Performance Benchmarking System of the Michigan Manufacturing Technology Center. Even though sometimes large numbers of firms subscribe to these services and provide data their usefulness to monitor organisational innovation in an internationally comparative perspective is very limited. Not only is the sample practice highly selective, also the questions (if at all tackling organisational issues) are designed for other purposes.

4.2 Different Needs of Measuring

The fact that many surveys ask questions such as, "between t and t+1 what organisational innovations were adopted" raises a fundamental question relating to innovation surveys. By their nature innovation surveys often only measure change in the time period covered by the survey. What is often of more interest is the level at the beginning of the survey period and the level at the end of the survey period.

However, it can and has been argued that performance success for the organisation is related not so much to its current organisational structure and management methods but instead to the success that the firm achieves in changing these structures. In such a world an emphasis upon firms adopting a particular organisational innovation is misplaced. The key to success is how well is the firm organised to change its organisation. Such a view of organisational innovation requires a rather different survey approach in which the rates of change matters, not the levels. We are not convinced however that surveys that concentrate only upon changes rather than levels always do so because of this rationalisation.
Independent from the issue of change and level oriented questioning another distinction can be made (cf. Coriat 1999) between asking for pre-defined organisational concepts (such as just-in-time, ISO 9000 or cellular manufacturing) and asking for features of an organisation (such as the number of hierarchical layers, the span of control, the degree of responsibility or the range of tasks at a certain level or among a specific employee group). The first is usually combined with more restricted samples of similar industries as for instance in the ISI manufacturing survey. However, it remains important how well the concepts are defined in order to avoid different understanding of the same term. The latter seems the only way forward when addressing diverse sectors with a single questionnaire as was particularly the case in the NUTEK and EPOC surveys. Here, operationalisation is crucial. Most surveys (not least the above mentioned ones) do not follow just one strategy but combine approaches.

Given the large number of existing surveys the question occurs whether cross-national comparisons on the basis of existing data may already be possible. Although almost all surveys address the currently most discussed elements of organisational innovation, such as group work, delayering, job enrichment/decentralisation, quality approaches or inter-firm co-operation, unfortunately, the diversity of questionnaires, question wording, and concepts as well as sample designs do not suggest that this is possible for more than a very limited selection of countries and sectors for the time being.

4.3 Diversity of Target Groups

Comparing the target groups or samples of the surveys again big differences emerge. The respective justifications appear to be quite different as well. There are well-considered selections based on theoretical, methodological, or pragmatic arguments as well as comprehensive approaches aiming to cover whole economies including public organisations. Whatever the decision is it has wide ranging implications for the suitability of question concepts and wording.

Three distinctions seem of particular importance in the field of organisational innovation:

- The sectors: Surveys reviewed range from concentration on very narrowly defined sectors even while addressing a large number of firms (e.g. NIFA panel in German mechanical engineering) to the inclusion of all types of organisations in an economy (“Flex” surveys in the Nordic countries, EPOC survey across Europe). Narrow target groups allow for differentiated questions and the use of items which refer to pre-defined concepts. With similar market, technological, and structural backgrounds common understanding and appropriateness of questions is more easily to achieve. Broad target groups require a more general, ab-
The survey entity or unit: Although this issue plays a very minor role in most of the survey methodological outlines, and is often not explicit at all, the review makes clear that where the border should be drawn when asking for the application/use or not of a certain organisational principle or management approach is crucial. Usually, the targeted entity is at least an establishment of a company or an organisation at a certain location (workplace). However, within questionnaires often only specific areas such as the shop floor, special departments or selected employee groups are addressed, depending on the aspect or type of organisational innovation of concern. The EPOC survey for instance referred to the „largest occupational group“. Often – in a more or less considered way – the survey samples consist of companies or organisations as a whole (thus referring to the legal frame an enterprise has chosen). While this might be an obvious way, given available address sources, from the viewpoint of examining organisational innovation, critical questions emerge. Not only in large companies very different types of operations with diverse frame conditions, products, and technological processes have to fit in to one questionnaire. A possible diversity of organisational structures would be ignored. Links between organisational change and performance of the company will be hard to detect. On the other hand, many organisational innovations concern the company level and the way different units are grouped and work together. The supra-organisational level of organisational innovation might even call for another, higher level survey unit: conglomerates or networks. However, there have found no examples of such an approach.

The size of the organisation: It is obvious that the relevance or form of many organisational innovations change with the size of the entity addressed by a survey. Cellular manufacturing in a five people workshop makes no sense. The number of hierarchical layers depends on the number of employees in the organisation. The surveys reviewed deal with this problem in different ways. They concentrate from the beginning on certain size groups (e.g. Top 1000 in „View from the top“, medium and large companies in INNFORM). Most exclude very small firms of below 20 employees. In addition, size as an intervening variable is – as far as the sample sizes allow – considered in the analyses of the data.

A crucial point which is often forgotten in this context is the person to be addressed within a company. The typical target group of the surveys on organisational innovation is the top management though they will only rarely be the ones who actually fill in the questionnaires. Thus, questionnaires will often undergo an odyssey within an organisation or be – at least partly – answered by a non-specialist. When a
specialised survey e.g. on technological innovation, tries to co-address other issues, reliability of responses may suffer. The R&D manager’s characterisation of managerial practises and organisational structures at the shop floor will (to say the least) differ from the production manager’s view.

4.4 Impact Analysis of Organisational Innovations

The implicit objective of surveying organisational innovations is not only sampling information on diffusion (the mapping function) but also to learn more about the impact of new organisational practices. However, the performance impact of organisational innovations in existing surveys is dealt with in completely different ways:

− Some of the reviewed surveys do not seek information on the effects of adopted organisational innovations.
− In other surveys the respondents were asked for their assumptions on the impact of organisational innovations. In these cases the impact analyses was restricted to perceived impacts.
− A third category of surveys tried to find performance indicators which could be influenced by organisational innovations. In these surveys the respondents were to give facts on these indicators, and the analysis of the data should detect correlation between organisational innovations and differences in performance.

Despite the methodological problems of impact analysis of any survey which is targeted to information on new forms of organising enterprises cannot neglect this task. Without information on the question whether measured differences in adopting new organisational practices have influence on competitiveness, the sampling of data on organisational innovations remains a torso.

The results of the surveys which try to solve the impact analysis problem by asking for perceived impacts shows that this solution is rarely able to collect reliable data. There is a tendency for overestimating positive impact if the respondents were responsible for the introduction of the organisational innovations.

A neutral investigation of impacts of organisational innovations is possible with two approaches:

− In one approach the respondents should give information on a set of performance indicators at two dates: before and after introducing organisational innovations.
− In a second approach establishments with and without organisational innovations give facts on their performance. A comparison between these two groups allows a ceteris paribus estimation on the impact of organisational innovation.
The set of performance indicators used in existing surveys on organisational innovations is broad. A distinction can be made between indicators on an operational level and overall indicators like profitability or market share. While profitability or market share are indicators which are targeted at market success, and therefore are very adequate to assess the benefit of organisational innovation for enterprise development as a whole, the correlation between organisational innovation and these indicators is complicated by several other factors which cannot be controlled for completely. Indicators on an operational level like product quality, time to market for new products, share of product innovations in turnover, lead times, flexibility towards customer demands etc. can be connected more easily with organisational innovations. They are directly influenced by new methods of production. However the impact of these operational indicators for the overall success of the enterprise is unclear.
5 Strengths and Weaknesses of Different Survey Approaches

The review of surveys provides the background and justification for recommendations on how organisational innovations should be tackled either within CIS or in other large scale surveys on the European level. “Feeding“ policy decision-making – not least taking account of basic research and theory-based analysis – would be a major aim of any large scale monitoring of organisational innovation on the European level. At the same time there are further stakeholders and interests associated with such surveying of organisational innovation. There are first the firms addressed. Whereas the individual firm may see very little reward but experience high effort in filling in ambitious questionnaires, industry as a whole and several industrial associations, trade unions, etc. can benefit from the information. In general, the cost-benefit-relation is of major importance as public funding (or possibly even administration) will most likely be necessary but is scarce.

This leads to a number of partly contradicting requirements of any survey method. These can be roughly grouped into four categories:

(1) **Technical validity**, e.g. representativity and adequate sample design, validity and reliability of questions (across countries, sectors, firm sizes, etc.) ...

(2) **Stakeholder acceptance**, e.g. acceptable cost of implementation and effort with respondents, cross-country comparability, quick and broad access and diffusion of data respectively results ...

(3) **Appropriate description of the state of the art**, e.g. comprehensiveness, diffusion across and within firms, detection and explanation of problems in view of industrial and innovation policy needs ...

(4) **Appropriate assessment of the determinants of organisational innovation and the impact on performance**, e.g. appropriateness of performance indicators, potential to examine causalities ...

These general requirements can be re-formulated in the form of a desirable content of survey questionnaires. Accepting that what is best may differ across organisations, good informative survey practice would

- contain considerable detail on the characteristics of the surveyed firm in terms of size, market, ownership, technology, etc

- enquire as to levels of use as well as changes in use. Thus questions should address the nature of the organisation prior to the start date of the survey period as well as innovations introduced during the survey period.

- contain considerable detail on organisational performance so that judgement can be made as to how the organisational structure and innovations therein impact upon performance.
explore the prior technology and what technological innovations were occurring in the survey period so that complementarities between these may be explored,

- not only ask questions as to whether the organisation uses a new organisational principle but ask for the extent to which an innovation is used within this organisation.

Finally, we distinguish five options how to survey organisational innovations which range from a small amendment on the existing CIS questionnaire to a parallel, independent survey activity on the European level. The options, their advantages and disadvantages are described in the following, with reference to existing examples and experiences with similar approaches:

### 5.1 Amendment of the CIS Questionnaire by a Single Question – Approach 1

The most obvious and apparently easiest way to survey organisational innovation on the European level seems to simply add a question to the existing CIS questionnaire. The aim is to distinguish technologically (product and process) innovative firms and organisationally innovative firms. Such a question might read as follows: "Between $t$ and $t+1$ has your enterprise introduced any organisational innovations?" (Note: organisational innovation is the adoption of new organisational structures or the application of new management instruments either within a sub-unit of the firm, the firm as a whole, or in the co-operation with other companies). Such a restricted approach with just an abstract explanation what is meant by organisational innovation has not been undertaken in existing surveys. Bearing in mind the above considerations with respect to organisational innovation such an approach would be of very limited use.

The least that is required is a much more detailed explanation of organisational innovation or a list of innovations. In the UK in the framework of CIS organisations were asked whether they introduced between 1994 and 1996 any of a list of organisational changes or new management techniques (see box). The survey was voluntary by means of a postal questionnaire. 2344 responded (a response rate of 43.2% after accounting for firms ceased trading). Around 95% of the sample have less than 250 employees. A non-response analysis was carried out of a sample of 317 non-respondents. No bias in the returns was found. Only provisional results have so far been published.
Tackling of organisational innovation in CIS II in the UK

Between 1994 and 1996 did your organisation introduce any of the following organisational changes or new management techniques (tick all that apply)

☐ EDI,
☐ JIT,
☐ Electronic Mail,
☐ Use of the Internet,
☐ Investors in People,
☐ Quality Management system or Standard (e.g. ISO9000),
☐ Benchmarking,
☐ other, please specify: ......................................
☐ None

This approach illustrates how a single question on organisational innovations can be introduced into the CIS methodology. However, the approach illustrates a number of the failings of such an approach.

- The approach specifies a number of organisational and managerial innovations, and although it offers “other” as an option, this list is not comprehensive. Thus for example Business Process Reengineering, performance related pay, team working, R&D joint ventures and quality circles are not included. Thus although the survey may give some insight into the use of the named innovations one may not necessarily get a true picture of the extent of innovation taking place.

- It is not clear that the innovations listed are the most important that could be listed or are just chosen randomly. It might be that these are considered representative of all innovations but we have no evidence that this is so.

- The innovations listed cover a number of levels, sub-unit, organisational and inter organisation with no distinctions between them. It is unlikely that innovations at the sub unit level would be representative of omitted innovations at the inter organisation level.

- The survey only looks at changes in practices. It gives no insight as to what practice was at the beginning of the survey period. We thus have no insight into the actual extent of use of the innovations only the change in the extent of use.

- There are no questions relating to the extent of the use of the innovations within the organisation. Thus we have no insight into the intra firm diffusion process.

- Although, as per the standard CIS questionnaire, there were a number of questions included on the objectives and barriers to innovation, these refer only to
product and process innovation and not organisational innovation. There is thus little insight into why firms undertake organisational or managerial innovations and their impact.

- There is very little in this survey that would enable one to explore the relationships between organisational innovation and the characteristics and performance of the reporting organisation.

The uniqueness of this survey comes from it being an attempt to include a question on organisational innovation in a CIS type questionnaire. Being a single question it provides an example of a minimum inclusion in that questionnaire. The actual question itself is primarily going to be useful for the purposes of mapping but even for that we are not convinced that this question gives a complete and full picture of the extent and depth of organisational innovation. Even if only one question is to be used, we feel that it may be possible to improve upon that included in this survey.

With respect to the above criteria we can summarise: The technical validity of such an approach is ambivalent. Whereas sample design and representativity of CIS sets a high standard, the validity of the kind of question in this framework will be questionable. Stakeholders might well accept the approach on the grounds of easy implementation at low cost (on the administrative as well as on the side of the respondents) and the CIS questionnaire would not become much longer. The logic of the current questionnaire would be kept. However, one should probably assume that the life cycles of organisational innovations are considerably longer than those of technical (and particularly product innovation) asking for quite different periods than those currently used. Diffusion and access to the data is – to a comparatively high degree – ensured. However, even the mapping function (and more so the identification of determinants and impacts) is not satisfactorily fulfilled and overall the resulting data is not really capable of fully refining scientific and policy debates.

5.2 Extension of the CIS Questionnaire by a Question Aimed at the Role of Organisational Innovations to Support or Enable Product Innovation – Approach 2

A solution which passes by most problems connected with option 1 could be a selective perspective based on the theoretical framework in the Oslo manual that regards organisational innovations as activities, or interrelated activities, which sup-

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4 We did not consider in this context such CIS surveys which simply added a question and/or provided space to specify other (non technological) innovation in the survey period. The Spanish questionnaire for instance includes in the final question 12:
- Did the company significantly change its organisational structure? yes/no
- Does the company follow a significantly new strategy? yes/no
- Other changes (please specify: ...)? yes/no
port product and process innovation. This approach would have two complementary dimensions with respect to changes in the existing CIS questionnaire:

- First, a question with a list of relevant organisational innovation in the area of R&D and product development in order to catch the organisational and management dimension of the technological (product) innovation process.

- Second, current CIS questions on the inhibiting and reinforcing factors in innovation would have to be extended and refer more specifically to organisational issues (such as contradicting organisational structures with users of a new product or technical process, etc.).

Such an approach could be justified on the basis of an understanding of the company or organisation as a knowledge-based system. The knowledge base of the enterprise is strongly linked to management, human capital and organisation. The performance of an enterprise from the perspective of its customers has become a priority for management. The ability of the enterprise to renew products and processes from customer perspective is closely linked to organisational topics such as organisational structures, the allocation of decision-making powers, co-ordination within the enterprise, co-ordination between the enterprise and its customers, and suppliers, and universities etc, the decentralisation of the internal and external co-ordination process, business processes and knowledge development. At both individual and organisational levels, knowledge development depends upon the ability to add new knowledge to existing knowledge.

Another argument lies in the limited explanatory power of traditional concepts of innovation and its driving factors. The main challenge for the work with the Oslo manual has been to define the boundaries of the concept of innovation and technological progress. The traditional way of handling this problem has been to focus attention on research and development (R&D) which has been seen as a relatively clearly defined set of activities contributing both directly and indirectly to changes in techniques and products. However, R&D is but one of many factors of technical change in the broad sense of the term. Denison (1985) estimated that R&D accounted for merely 20% of all technical progress.

The Italian survey on „Organisational change in product design and development“ by Bonnacorsi/Manfredi (1999) is an example of the option 2 type approach. The survey was carried out in 1998 via mail questionnaire to firms in the Association of Mechanical Industries (ANIMA), covering mainly mechanical component manufacturers. The list comprised 980 firms, of which 135 replied and accepted to participate. The questionnaire was extensively tested, firstly with a group of graduate engineers, secondly with some technical directors within firms. The proposed approach was to approximate organisational change in product development and design by looking at the pattern of adoption of a large group of managerial practices used in the technical department and company-wide:
- Market analysis (market test with personal interview or with team guided meeting, user analysis, analysis of past product experiences, probabilistic models for the identification of customer preferences, concept testing, conjoint analysis)
- New product development (concurrent engineering, value analysis, target costing, rapid prototyping, QFD, robust design/design of experiments)
- Cost estimation (expert opinions, empirical relations between estimated cost and selected design parameters (parametric estimation), detailed analysis of the estimated cost, estimated cost software, life-cycle costing
- Formal and quantitative estimate of product reliability (FMEA/FMECA, events or failures tree method (FTA etc.), reliability block diagrams, experimental tests, risk analysis (safety))
- Design for X (human factors, industrial design, design for manufacturing and assembly, design for serviceability, design for environment, life-cycle assessment, design for disassembly, product retirement, recycling)
- Design review (product plan and technical specifications, project check, information’s to the designers on the customer assistance, customer involvement/consultation, customer satisfaction valuation by market research among users)

Points of interest here are:
- Even within a subset of all organisational changes, it is possible to identify a long list of managerial practices.
- Some of them are not easily accessible to researchers in organisation, management or economics; as a matter of fact the questionnaire was developed in strict collaboration with a group of academic engineers and extensive testing with technical directors.
- Data show that complementarities in adoption do play a great role, with some clusters of practices more frequently associated to higher performance.

NISTEP in Japan has also undertaken a study of R&D management in Japanese firms published in 1993. This survey of 149 firms aimed to verify awareness in Japanese industry of strategic R&D management systems and to identify what Japanese companies are doing and planning to make their R&D systems more effective and efficient. The survey is interesting for its efforts to match the use of particular organisational innovations in the sphere of R&D management with performance outcomes related to R&D (e.g. patents, new products) and business performance (e.g. new sales from innovative products). The survey has been used by NISTEP to assess awareness in Japan of strategic management of R&D. In 1994-5, a comparable survey was undertaken in France by BETA, Strasbourg, which allowed selected international benchmarking.
The box shows what this approach means to the CIS questionnaire, how and where questions could be amended in order to cover the organisational dimension relating to product innovation in a company. We took the CIS II manufacturing as the reference and would propose to consider additional items in question 9 on objectives and question 12 on hampering factors. An additional question (11.a) would target the organisation and management of product development/innovation.

### Tackling of R&D/innovation management as an amendment of CIS II

The main reasons for developing and introducing innovations are asked in this question. Please indicate the degree of importance attached to various alternative objectives by ticking.

| Objective                                                      | Not relevant | Importance |
|                                                               |             |            |
|                                                               | 0           | 1 2 3      |
| Replace products being phased out                             |             |            |
| Improving product quality                                     |             |            |
| ...                                                            |             |            |
| ...                                                            |             |            |
| Enable/support new organisational structures or management techniques. (**new item**) |             |            |

#### 11.a. Use of new organisational or management techniques for product innovation between 1994 and 1996? (**new question**)

| Technique for product innovation                              |             |
|                                                             |             |
| Concurrent/simultaneous engineering                          |             |
| Cross-departmental temporary development teams               |             |
| Project management methodology (e.g. value management, benchmarking, FMEA, QFD, target costing, life cycle analysis, etc) |             |
| Participation of users                                       |             |

#### 12. Factors hampering innovation
The innovation activity of your enterprise could be hampered by various factors, which might prevent innovation projects or slow up or stop projects in progress.

a) Has at least one innovation project in 1994-1996 been seriously delayed/abolished/not even started?

b) If yes on at least one question, tick the relevant factors in the respective columns.

| Hampering factors                                             | seriously delayed | abolished | not even started |
|                                                             |                  |           |                |
| Excessive perceived economic risks                           |                  |           |                |
| ...                                                            |                  |           |                |
| ...                                                            |                  |           |                |
| Organisational inertia with the users (**new item**)         |                  |           |                |
| Inadequate management of project (**new item**)              |                  |           |                |
| Failures of external partner(s) (**new item**)              |                  |           |                |
| Inadequate organisation of R&D (**new item**)               |                  |           |                |
Option 2 would provide the principal advantages of the CIS context with respect to sampling, administration and data access. However, it would avoid the validity problems of option 1, as a selective (functional) perspective on organisational innovation is applied. The effort to develop appropriate questions and the (physical) extension of the questionnaire would be limited. The general philosophy of CIS with R&D-based product innovation at the core would not be changed. Such an approach would therefore probably be accepted in the R&D community as it would not encroach on such areas of interest in the CIS questionnaire. On the other hand it would only cover one dimension of organisational innovation. Thus, any claim of full coverage of the issues in CIS would be wrong and should be avoided. A more comprehensive tackling of organisational innovation in another context would still be necessary. From the viewpoint of sound monitoring of organisational innovation option 2 two calls for a combination with approaches 4 or 5 below.

5.3 Comprehensive Integration of Organisational Innovation in CIS by a Set of Questions – Approach 3

Our third option is a full restructuring of the CIS questionnaire to fully reflect issues of organisational innovation. If the understanding of innovation in the firm (or in an organisation in general) follows our proposed four-field matrix (figure 2) a comprehensive integration of organisational innovation (and possibly service innovation as well) is desirable, covering the full range from sub-unit to supra-organisational and from structural to managerial innovations. In addition, specific items needed to be included relating to the inhibiting or fostering factors, the internal diffusion and the impact of organisational innovations. Holding these issues in mind a series of possible questions could be asked

A. Between time \( t \) and time \( t+1 \) did your organisation introduce any of the attached list of organisational and managerial innovations? A comprehensive list of such innovations is provided. This question does not address the levels issue, or the intra firm issue and its utility depends upon the comprehensiveness of the list provided. It may also be that any such list is more likely to concentrate upon managerial rather than organisational innovations

B. At times \( t \) and time \( t+1 \) did your organisation make any use of the attached managerial and organisational practices? To the question a list of practices is appended. This would give information on levels and changes but otherwise the objections are as in A.

C. At times \( t \) and \( t+1 \) to what extent on a scale of 1 (none) to 5 (much) did your organisation make use of the attached managerial and organisational practices? This would overcome the issue of intra firm diffusion but is subject to the same objections as B.
For each of these questions the list of organisational and managerial innovations appended is crucial. It would seem advantageous to have two lists. One relating to named innovations e.g. Team work, quality circles, TQM, JIT, Joint Ventures etc., with the other relating to organisational characteristics. In this latter one might include for example delayering, decentralisation, project based organisation, downscoping etc. If there were room for two questions then it would be most advantageous to separately address these two aspects of managerial and organisational innovation.

If it is agreed that more than mapping is desirable then the next step is to explore the promoters and hindrances to organisational innovation. One possible approach would be to have a new set of questions in the CIS specifically relating to organisational and managerial innovations asking what promoted and hindered the same. However, in the current CIS there are already a number of questions that address these issues as regards product and process innovation but with a limited possibility of responding differently for each type. It would seem to be a possible step to allow these questions to be split three ways between product, process and organisational/managerial innovations. This could produce information of great relevance.

However, what seems a minimum amendment raises the fundamental question whether the extended understanding of an “innovative firm” (as including also companies which introduced organisational or managerial changes in the survey period) still allows to refrain from strictly relating in the questionnaire the resources and factors to the type of innovation. The problem arises with the – majority of – firms conducting product, process, and organisational innovations at the same time (though not necessarily related). Figure 5 shows the two general options.

**Figure 5: Alternative Concepts of an Extended CIS Questionnaire**
Finally there is the issue of the performance impact of managerial and organisational innovation. Here it would be most advantageous if the complementarity between different organisational innovations and between organisational and product and process innovations could be fully explored. However, even in its present form the CIS questionnaire devotes little space to addressing the performance impact of product and process innovations and as such we do not see that there is much opportunity to address issues relating to the impact of organisational/managerial innovations.

The Australian “Innovation in Industry” survey of 1997 follows a CIS-like approach and expands the definition of the innovative firm towards organisational/managerial innovation (see box). All later questions on resources, barriers, etc. refer to “innovation activities” in general. The first concept in figure 4 shows this principle. However, an additional block of questions on a specific innovation project (to be selected by the answering company) at least provides respective data for an example. Finally, the Australian survey covers the introduction of new manufacturing technologies thus allowing for analyses of complementarities between organisational and technological innovation on relatively concrete grounds. The general advantages and the possible outcome of a comprehensive coverage of organisational innovation in large scale surveys could also be judged through examples presented under approaches 4 and 5.

Besides the advantages of the CIS context the main charm of the option 3 approach would be the possibility to comprehensively investigate the complementarities of technical product and process and of organisational (or even service) innovation. However, this aim taken seriously would mean revolutionizing the CIS questionnaire and possibly the approach with respect to sampling, target groups, survey units, etc. as well. The concept of the “innovative firm” which underlies the CIS only refers to changes/innovation in a certain period and does not take account of the already achieved level. In addition, one has to assume that life cycles of organisational innovations tend to be longer than those of technological processes and of products in particular. Consequently, organisational change measured with respect to a relatively short period might not so clearly characterise “good” innovative firm.

The development of and agreement on such a questionnaire would take long time. It is not clear from the beginning if the current philosophy of the distinction of innovative and non-innovative firms/organisations could still be applied anymore. The questionnaire would either have to be extended very much or do without the current depth with respect to product and process innovation (and the R&D community – a term which is meant to comprise researchers as well policy makers in the area – currently is the major user of CIS). Given the complexity of the issues to be monitored it would still be questionable if an adequate mapping and the identification of determinants and impacts of all aspects of innovation could be achieved in an appropriate way. We thus do not consider approach 3 as a realistic option.
Excerpt from the “Innovation in Industry” questionnaire 1997 of the Australian Bureau of Statistics

**Organisational/managerial innovations**
Organisational/managerial innovations are changes to the business’ strategies, structures or routines which aim to improve the performance of the business

**Examples**
**Include**
- Changed corporate directions, e.g. focusing on a new line of business or the introduction of a new business culture or philosophy
- Changes in management structure
- Introduction of new management techniques
- Change in workplace composition, e.g. employing specialist staff
- Adoption of enterprise bargaining
- Introduction of, or changes to, computerised personnel or financial accounting systems
- Improved business diagnostics or performance measures
- Introduction of, or changes to, staff training and development programs
- Workplace reorganisation
- Introduction of, or changes to, communication and information networks

**Exclude**
- Changes which simply replace outdated methods or equipment
- Changes which affect the production process, such as computer systems to monitor product quality

13 Did the business introduce or upgrade any office computing equipment or packages during the period 1 July 1994 to 30 June 1997?
No  (Go to 15)
Yes

14 Which areas of the business’ activities were affected?
Tick one or more boxes
- Human resource administration … … …
- Financial recording … … … … … … …
- Internal communication or information sharing … … … … … … …
- Inventory control … … … … … … …
- External communication or information sharing … … … … … … …
- Business performance analysis … … …
- Customer or supplier ordering … … …
- Other (please specify) … … … … … … …

15 Please indicate which of the following management techniques were used by the business during the period 1 July 1994 to 30 June 1997
Tick one or more boxes
- Total quality management … … … … …
- Value adding management … … … … …
- Just in time … … … … … … … … … …
- Manufacturing resources planning … … …
- Other (please specify) … … … … … … …

11 During the period 1 July 1994 to 30 June 1997, did the business introduce any organisational/managerial innovation?
No
Yes

12 Please indicate whether, during the period 1 July 1994 to 30 June 1997, the business reorganised or restructured its
Tick one or more boxes
- Physical layout … … … … … … …
- Management structure … … … … … …
- Workgroups … … … … … … … … …
5.4 Harmonisation and Deployment of Existing Regular Surveys in European Countries – Approach 4

A very effective way to come to European-wide monitoring of organisational innovation would be if one could build on existing surveys, which are already being carried out and focus on organisational innovation. Possibly without impinging too much on the other purposes of such surveys within their respective national framework, it might be possible to mutually agree on a number of core questions on organisational innovations. Given a certain stability of the conducting institutions and their commitment to viable sample practise, the only other major task beside the harmonisation of questionnaire items would remain to ensure the availability of the results to the different groups of stakeholders in the respective appropriate form. In addition, such harmonised survey could probably be extended to third countries easily where an appropriate conducting body does not (yet) exist.

The proposed core group of questions on organisational innovation should be selected according to the relevance (impact on competitiveness, the degree of change, the cross-sectoral nature, the diffusion, or the like) according to what is already covered in regular surveys which lend themselves to such a harmonisation exercise. On the basis of our review issues would be: team work, quality approaches (ISO 9000, TQM, EQA), decentralisation/job enrichment, de-layering, R&D co-operation between firms. To ensure compatibility across sectors, nations, etc. and to take account of the above mentioned general criteria of good survey practise questions should go beyond labels and define the topic rather strictly. A common understanding of the questions has to be ensured. An example would be as follows: Does your company use teamwork? Where ...? To what extent ...? If your enterprise has introduced teamwork: How many workers are in the teams on average? Are quality assurance tasks integrated in the team responsibility? Are planning tasks integrated in the team responsibility? Are all team members qualified for all team tasks?

Harmonisation should also include the way the characteristics of the firm/organisation, its environment, determinants of organisational innovations and impact are surveyed respectively measured.

Among the reviewed surveys (not taking into account especially designed cross-national surveys), two examples of international harmonisation of already established questionnaires for further rounds of these surveys already exists:

- The Georgia manufacturing survey shares a lot of questions with the ISI manufacturing survey (see box). Even dates of field access were brought close while the target groups (manufacturing respectively capital goods industry) were overlapping from the beginning. The harmonisation was made possible since the responsible person for the Georgia survey spent a year as a visiting researcher at the ISI just before the next implementation and thus the development respec-
tively re-working of the questionnaires had to be carried out in Germany any-
way. Nevertheless the process was hard work and many compromises had to be
done. But now not only comparisons of organisational and technological change
between US and Germany are possible but one can also refer to identical
economic indicators in the questionnaire.

Harmonisation of the Georgia and Fraunhofer ISI Manufacturing Surveys

4. Does your facility use the following manufacturing technologies and
techniques? (If use, please indicate the year use began, and check box if you plan to expand
use to other areas in next 2 years. If not use, please indicate whether you plan to use it in the
next 2 years. If not, check why not.)

<table>
<thead>
<tr>
<th>Management Methods</th>
<th>Use</th>
<th>Not use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cellular manufacturing</td>
<td></td>
<td></td>
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<tr>
<td>Employee continuous improvement and problem</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Just-in-time (JIT) to customers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concurrent or simultaneous engineering</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISO 9000, QS-9000 certification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ISO 14000 environmental management certification</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Welche der folgenden organisatorischen Gestaltungselemente kommen in Ihrem Betrieb derzeit zur Anwendung?

<table>
<thead>
<tr>
<th>Schätzung des genutzten Potentials</th>
<th>verstärkter Einsatz</th>
<th>Einsatz geplant</th>
<th>Einsatz nicht geplant, da geeignete wirtschaftliche Lösungen fehlen</th>
<th>Anwendungs-möglichkeiten im Betrieb fehlen</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>Ja</td>
<td>Nein</td>
<td>KVP - Kontinuierlicher Verbesserungsprozess</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Ja</td>
<td>Nein</td>
<td>Just-In-Time bei Anlieferung zu Kunden</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Ja</td>
<td>Nein</td>
<td>Simultaneous Engineering (Parallelisierung von Entwicklungsschritten)</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Ja</td>
<td>Nein</td>
<td>Zertifizierung nach DIN ISO 9000ff.</td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>Ja</td>
<td>Nein</td>
<td>Umweltaudit nach DIN ISO 14001 oder EMAS</td>
<td></td>
</tr>
</tbody>
</table>
In the Nordic countries the process was more an extension of the Swedish survey to the other countries than a harmonisation. Consequently a very comprehensive and ambitious questionnaire is now the basis for comparisons and in addition, national backgrounds do not differ so much. This could be a very good way forward and may lead to a cross-national survey tradition. However, it can still – with later recalls – open up discussions, particularly when strong national institutions already active in the field have own interests.

Based on existing, established activities with well recognised organisations this approach has a similar head start advantage as the CIS. Extension to third countries of such already established survey methodology seems possible. The question is whether there are enough suitable candidate surveys across Europe to start the exercise. Is the overall direction/purpose and the institutional background of the surveys compatible with such an approach? How to organise the actual harmonisation process? Also, the access to the data or a European wide presentation of results directed at different target groups has to be organised – e.g. by a regular European report on organisational innovation. The above examples appear to justify at least a feasibility study exercise.

5.5 Development and Implementation of a Self Standing Survey on Organisational Innovations – Approach 5

The most demanding approach would be to develop and implement a questionnaire survey on the European level. It would be across sectors, in parallel and complementary to CIS and already existing national surveys.

The INNFORM project is an example of such an exercise. It comprises a large-scale standardised survey of new organisation practices in Europe, Japan and the US. The aims of the project are to map the contours of contemporary organisational innovation, to examine the management practices involved in the process of innovation and to test for the performance benefits of these changes. The research is being carried out at the Universities of Oxford and Warwick in the UK, Duke University (US), Erasmus (Holland), ESSEC (France), Hitosubashi (Japan), ISEES (Spain), Jonkoping (Sweden) and St. Gallen (Switzerland). The survey was funded by the Economic and Social Research Council (UK) and others.

The questionnaire was aimed at chief executives of large and medium sized independent domestically owned firms throughout Western Europe (in own language) selected as the largest 1500 independent businesses by employment in the UK and another 2000 in Western Europe in proportion to home country GDP. The survey was undertaken in 1997 with questions relating to 1992 and 1996. There was an overall response rate of 13.1% after telephone follow-ups. Of the respondents, 40.7% were British and 15.9% German with no other single country accounting for
more than 10%. Tests on the UK sample indicated no response bias relating to size, industry or profitability.

The survey questionnaire is very comprehensive (see selected questions in box). A prime characteristic of the questionnaire is that it addresses both levels and changes. The main aspects of the questionnaire of interest are company structure, sub unit autonomy, corporate control, linkages between HQ and sub units, linkages between sub units, the use of IT in the company, strategy, performance, the nature of the market, people issues. The questionnaire is ten pages long with some questions of high complexity (e.g. compared to CIS).

In addition to the survey responses on performance the researchers have also added financial measures of performance obtained from company accounts (using CD-database One as the source) for the UK sample companies but this was not possible for continental European companies because of the difficulty of obtaining published performance data. The results of the survey are still in the process of being analysed. Two papers have however appeared. The first by Ruigrok et al (1999) is primarily concerned with the mapping of corporate restructuring in Europe. The second by Whittington et al (1999) provides in addition material on the relationship between organisational innovation and performance.

In summary this survey gives good insight into the extent of use of organisational innovations in different countries, how countries differ, the general trends across Europe as a whole and also the impact of the innovations and the determinants of the impacts.

Although the INNFORM survey provides considerable detail on the extent and impact of such innovations that study is not fully comprehensive of the whole of the EU and moreover is now dated (its closing observation date in 1996). There are, as far as we know, no plans to repeat the INNFORM survey.

These experiences indicate that even given the methodological advantages of such an approach the actual European-wide realisation would be very difficult, time consuming and costly. The technical validity of the questions could be very good though even with this approach selections have to be made. Unless the survey is not conducted by an official organisation (or the response is enforced by other means) problems with sample sizes and representativity are likely. The INNFORM survey for instance received only 95 usable answers across all German speaking countries. Stakeholder acceptance is difficult to assess as effort, quality and quick availability of results are hardly predictable. The possibility of mapping organisational innovation as well as to identify determinants and impact in a fairly comprehensive way would be at the expense of the in-depth examination of complementarities with technical product and process innovation.
Excerpt of "Organisational Innovation and Performance in the 1990s" (INNFORM)

COMPANY STRUCTURE

2. How many staff were there on the head office payroll in 1996 and in 1992?

3. Please indicate where your head office staff responsible for key central functions such as human resources and/or finance are located? Please tick the one which most closely applies for 1996 and for 1992.
   a) One building or site
   b) In several locations nationally
   c) In several locations internationally

4. How many senior managers reported directly to the chief executive with no intervening level in 1996 and in 1992

5. How many organisational levels were there between the manager with the lowest level of profit responsibility and the chief executive in 1996 and in 1992? Please count the longest line.

6. Please indicate the extent to which your corporate structure was formally organised along each of the following lines in 1996 and how it was organised in 1992. For each item please circle the number which most closely applies for each of the two time periods.

   **Emphasis**
   None Little Moderate Much Great

   a) Products and/or services
      1996 1 2 3 4 5
      1992 1 2 3 4 5

   b) Geographical regions
      1996 1 2 3 4 5
      1992 1 2 3 4 5

   c) Functions (eg marketing, finance)
      1996 1 2 3 4 5
      1992 1 2 3 4 5

   d) Project-based structure
      1996 1 2 3 4 5
      1992 1 2 3 4 5

7. Approximately how many profit centres did your organisation have in 1996 and in 1992?
6 Conclusions and Outlook

The surveys that we have explored, whatever their advantages and disadvantages, and the preceding discussion, make a clear case as to the desirability of more information on managerial and organisational innovations in Europe (and elsewhere). Thus if more information and more up to date information upon organisational innovations is to be made available new surveys will have to be undertaken. It is our view that such information would be valuable. We thus consider that there is a good case for further surveys.

The nature of any questions that might be included in the CIS or any other survey upon organisational and managerial innovations depends crucially upon the issues that are to be addressed by the survey. There are three main issues in this field that merit addressing

- The extent of innovation. This is the mapping function of any survey. The aim must be to explore the extent (including intra firm) of organisational and management innovation across firms, sectors, countries, and Europe as a whole. The parallel would be the questions in the current CIS on the extent of product and process innovation.

- The determinants of innovation. In order to understand patterns of innovation in organisation and management it is important to see what factors have been impinging upon such innovative activity. In the standard CIS questionnaire there are many questions addressing directly and indirectly the barriers to product and process innovation and the expected benefits therefrom, and it would be informative to have similar information upon managerial and organisational innovation

- Thirdly it would be of value to know how innovation affects performance. However, even with product and process innovations the existing CIS questionnaire provides little insight here.

6.1 Recommendations

The different forms of innovation: technological product and process as well as organisational and service innovation can first be understood as changes in their own right which directly impinge on firm performance and competitiveness. Secondly they are each supportive of the respective other forms of innovation (for instance to product innovations) thus indirectly (e.g. via improved product innovations) influencing company success. The first understanding justifies a comprehensive, targeted monitoring of each form of innovation. The second role could and should be investigated in specific surveys such as CIS largely with respect to R&D-based product innovation.
As a tool for innovation surveys, the CIS has many advantages. In particular it has a wide area of coverage, is internationally comparative and is repeated at regular intervals. On the other hand the CIS questionnaire is already very long and consequently the possibilities of extending it are very constrained. A simple amendment of CIS which aims to define an innovative firm simply by the fact that it implements organisational innovations, in addition to technical product and process innovations, would most likely not prove successful unless a very comprehensive question were used and all other parts of the questionnaire were adapted accordingly. But CIS III could be used to probe targeted questions concerning the effects of organisational innovation with respect to new product design. More comprehensive analyses of organisational innovation should be addressed by adopting a complementary large scale approach, possibly making use of existing regular surveys.

We thus recommend that modest organisational innovation modifications to the CIS be coupled with support for the harmonisation of existing, separate, but more comprehensive surveys. Experts responding to the panel review of our findings and recommendations supported this proposal. It would provide balanced and improved perspectives on organisational innovations in Europe, with least cost and burden to the CIS survey process and to industry (particularly, when compared to an additional independent survey). As quick information is desirable the above proposed harmonisation could start as a feasibility or experimental study with a limited country coverage and include the review of already available (although scattered) results from existing surveys as a first deliverable (annual organisational innovation observatory study).

6.2 Proposal for a Project to Harmonise Existing, Regularly Undertaken Surveys on Organisational Innovations

The proposal to harmonise existing national surveys for collecting data on organisational innovations in industry has the character of a feasibility study. The aim of this study would be:

- to collate the comparable data from already conducted national surveys as soon as possible, in such a way that for parts of the European Community a provisional picture how diffuse at least some organisational innovations in industry can be painted;

- for the next planned national survey rounds to compare/prepare a core area of questions on organisational innovations in such a manner that in two years at the latest up-to-date, consistent and comprehensive data on the status of organisational innovation in the core countries of the European Community are available; and
to create a basis so that in the medium term those countries where no regular national surveys have been carried out till now can be integrated into the group of countries with harmonised surveys.

The study has the character not only of a feasibility study but also of a pragmatic initial information compilation for decision-makers in politics and industry.

The following national surveys should be incorporated into the feasibility study:

- "Flexible Work Organisation" survey in the Nordic countries
- "Organisation and its Evolution" survey in Italy
- "ISI Manufacturing" survey in Germany (extension to Austria and Switzerland under discussion)
- Innform survey, covering especially the UK
- Georgia Manufacturing in the USA.

Thus the feasibility study would include half of the member states of the European Union. Further contacts are already established, namely to France (IREP, SESSI) and Belgium (STV-Innovatie&Arbeid with its TOA screening activity) and may be considered for participation. In addition, a comparison with the United States as a further significant economic area in the Triad would also be possible. Should other countries or institutions be willing to adopt a harmonised questionnaire of the participating partners and to finance a survey in their own country, an extension is also possible.

The study could commence in June 2000 and would run for two years. It would deliver the following outputs:

- Autumn 2000: Synthesis report on preliminary findings on the state of modernisation of organisation in European industry
- Spring 2001: Set of harmonised core questions for surveying organisational innovation.
- Summer 2001: Pilot survey with the harmonised questionnaire in the Nordic countries, Great Britain, Italy, Germany and the United States.
- Winter 2001: Analysis of data.
- Summer 2001: Recommendations for extending and establishing regular surveys.

The cost of the harmonisation proposed here would amount to ca. 350,000 Euro according to rough estimates. The cost estimate is only possible because the pre-
paratory work, the conduct of the surveys and the analyses do not have to be financed, but only the additional expenses incurred by the partial harmonisation of the survey instruments. The Fraunhofer Institute for Systems and Innovation Research would co-ordinate the project.

An additional option to the work already proposed here would be to offer a benchmarking opportunity on the modernity of organisational structures in industry, based on the survey data generated on European companies. With the data collected, it is possible to put together on request an anonymous comparison (control) group of firms which correspond in size, branch, product palette and other specifications to the inquiring firm. The modernity of the organisation of this control group serves as a measuring stick for the inquiring firms in estimating the performance of the own organisation. If the expense for such an organisation benchmarking is billed to the inquiring firms at cost price, then the benchmarking offer will not entail any additional expense for the customer.
7 References


Stoneman, P. (1999): Surveying Organisational Innovations: The Search for Good Practise Based on the CIS(UK) and INNFORM Surveys


8 ANNEX

8.1 Description Frame for Surveys on Organisational Innovation

<table>
<thead>
<tr>
<th>1 Implementation</th>
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<tbody>
<tr>
<td>1.0 PURPOSE</td>
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<tr>
<td>(name/title, conducting institution, funding institution)</td>
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<table>
<thead>
<tr>
<th>1.1 SAMPLING</th>
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<tbody>
<tr>
<td>(type of sampling (workplace vs. enterprise ..., sectors, regions, respondent type), population, size of sample, year of reference)</td>
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<tr>
<th>1.2 ADMINISTRATION</th>
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<tbody>
<tr>
<td>(type of administration (mail, telephone, direct; standardised vs. non-standardised), response rate, non-respondent analyses, follow up/recall, year(s) of field access, budget)</td>
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<tr>
<th>1.3 DEVIANCY TESTING</th>
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<tr>
<td>(testing of questionnaire, understanding of questions, missing data, reliability analysis, validity analysis)</td>
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<tr>
<th>1.4 INFEERENCE</th>
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<tbody>
<tr>
<td>(type of analysis (descriptive-correlation-regression), appropriateness)</td>
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<table>
<thead>
<tr>
<th>2 Content</th>
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<tbody>
<tr>
<td>2.0 OBJECTIVES OF SURVEY</td>
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</table>

<table>
<thead>
<tr>
<th>2.1 BREADTH OF SURVEY</th>
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<tbody>
<tr>
<td>(product innovations, process innovations, organisational innovations, performance, etc.)</td>
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</table>

<table>
<thead>
<tr>
<th>2.2 DEPTH OF SURVEY</th>
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<tbody>
<tr>
<td>(areas of organisational innovations covered, asking for labels/concepts versus asking for features and categorise afterwards)</td>
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<table>
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<tr>
<th>2.3 INFORMATION ABOUT ORG. INNOVATION</th>
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</thead>
<tbody>
<tr>
<td>(yes/no, date of introduction, diffusion within enterprise, selectiveness with respect to employment group, departments etc.)</td>
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<tr>
<th>2.4 PERCEIVED IMPACT VERSUS „OBJECTIVE“ IMPACT ANALYSIS</th>
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<table>
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<tr>
<th>2.5 WHAT’S INTERESTING/UNIQUE ASPECTS</th>
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<table>
<thead>
<tr>
<th>3 Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0 USE OF RESULTS ON ORGANISATIONAL INNOVATIONS</td>
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</table>

<table>
<thead>
<tr>
<th>3.1 USE IN EVALUATION; TECHNOLOGY POLICY FORMULATION</th>
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<table>
<thead>
<tr>
<th>3.2 TYPE OF RESEARCH QUESTIONS ANSWERED</th>
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<table>
<thead>
<tr>
<th>4 References</th>
</tr>
</thead>
<tbody>
<tr>
<td>(contact person, publications, internet access)</td>
</tr>
</tbody>
</table>
8.2 List of Surveys Reviewed

FLEX-2: Change in Enterprises
NUTEK (Sweden)
First report under progress (to be completed in the beginning of year 2000).
Conducting institution: NUTEK, department of industrial policy analysis.
Collecting institution: Statistics Sweden (Statistiska centralbyrån).
Sample from register 1998 (according year 1997), Survey pursued: 1998

Enterprises as Employers in Finland
Statistika Finland/Ministry of Labour (Finland)
Conducting institution: The Ministry of Labour, Finland
Collecting institution: Statistics Finland.
Survey pursued: autumn 1996

Flexibility in Norwegian Working Life
Institute for Social Research (Norway)
Funding and conducting institution: Institute for samfunnsforskning (Institute for Social Research)
Collecting institution: Statistics Norway (Statistisk Sentralbyrå)
Survey conducted between February 1997 and March 1997

Workplaces in Sweden
National Institute for Working Life (Sweden)
SNS Förlag (SNS Publication) ISBN 91-7150-492-3
Funding institutions: (The former) Swedish Fund for Working Life, Swedish Council for Research in the Humanities and Social Sciences (HSFR), Swedish Council for Planning and Coordination (FRN), Socialvetenskapliga forskningsrådet (SFR) and The National Agency for Education among others.
Collecting institution: Statistics Sweden (Statistiska centralbyrån).
The Flexible Firm – Pressures For Change and Innovation in Danish Enterprises
University of Aalborg, Department of Business Studies (Denmark)

Conducting institution: University of Aalborg, Department of Business Studies, The Danish System of Innovation in a Comparative Perspective - the DISKO-project
Funding institution: Ehrvervsudviklingsrådet
Collecting institution: Statistics Denmark
Survey was conducted: spring, summer 1996

View From the Top
Financial Services Research Centre University of Manchester UMIST 1996 (UK)

A survey undertaken by Ezzamel, Lilley and Willmott of the Financial Services Research Centre, University of Manchester Institute of Science and Technology. Funded by the Chartered Institute of Management Accountants. It is argued that previous survey evidence was very limited and flawed and this survey was designed to "corroborate and extend the findings of previous surveys by, for example, asking more detailed questions and incorporating refinements that were absent in earlier work".
Undertaken in 1992/3

Organisational Innovation and Performance in the 1990s (INNFORM)
Oxford, Warwick, further international universities (UK, US, NL, F, J, E, SE, CH)

The INNFORM project comprises a large-scale standardised survey of new organisation practices in Europe, Japan and the US, combined with twenty case studies (which are not addressed here). The aims of the project are to map the contours of contemporary organisational innovation; to examine the management practices involved in the process of innovation and to test for the performance benefits of these changes. The research is being carried out at in the UK, Duke University (US), Erasmus (Holland), ESSEC (France), Hitosubashi (Japan), IESES (Spain), Jonkoping (Sweden) and St. Gallen (Switzerland). Only the European part is discussed here. Funded by the Economic and Social Research Council (UK) and others. Survey undertaken in 1997 with questions relating to 1992 and 1996.

Community Innovation Survey (CIS-UK 1998)
Office of National Statistics (UK)

This survey is the UK element of the Community Innovation Survey. It uses the standard questionnaire but some extra questions on organisational and management change have been added. The survey was conducted by the Office of National Statistics on behalf of the Department for Trade and Industry.
The survey covered enterprises in the UK with more than ten employees with fieldwork undertaken between August 1997 and March 1998 and the reference period for the survey was 1994 - 1996.
Workplace Employee Relations Survey (WERS98)

Department of Trade and Industry (DTI) and the Advisory Conciliation and Arbitration Service (ACAS) (Great Britain)

The 1998 Workplace Employee Relations Survey (WERS98) is the fourth in a series of surveys that began in 1980 (previously known as the Workplace Industrial Relations Survey, WIRS), its primary aim is to provide statistically reliable representative data on the current state of workplace relations and employment practices in Britain. Earlier surveys have also been replicated for Australia.

WERS98 has four parts. A cross section management questionnaire, a worker representative questionnaire, a 1990-1998 panel questionnaire and an employee survey. Of these four we only consider the first, this being the component with content of most relevance to organisational innovations.

The principle investigators are the Department of Trade and Industry (DTI) and the Advisory Conciliation and Arbitration Service (ACAS), with the DTI, ACAS, The Economic and Social Research Council and the Policy Studies Institute as sponsors.

The data was collected by Social and Community Planning Research.

The fieldwork was carried out between October 1977 and June 1998.

Quality Information Systems and Management Survey

C. Forza, Vicenza (Italy)


Intra- and Inter-organisational Routines

Guiseppe Delmestri, Bocconi University, Milano (Italy) in co-operation with University Mannheim


Study financed by the Italian Ministero dell’Università e della Ricerca Scientifica, and benefited from the financial support of the EMOT Program (ESF) and SDA Bocconi.

Organisation and Its Evolution in Metalworking Plants

Massimo G. Colombo and Marco Delmastro (Italy)


Financial support has been provided by Università di Pavia 1997 FAR funds.

Sample drawn in 1989 stratified for plant size, industry and geographical location.
Supplier Involvement in New Product Development
Andrea Bonaccorsi, Pisa University (Italy)


Georgia Manufacturing Surveys (GMS)
School of Public Policy at Georgia Institute of Technology (Georgia, USA)

The manufacturing sector in the state of Georgia has grown in size over the last decade, and now employs about 600,000 workers in just under 11,000 manufacturing establishments. The Georgia manufacturing surveys focus on the adoption of technological and organizational innovation by manufacturers in the state, assess impact of program interventions on adoption, and provide information for policy and program planning. The 1996 and 1999 surveys have a greater emphasis on organizational innovation than the 1994 survey.

The Georgia surveys have been conducted by Philip Shapira of the School of Public Policy at Georgia Institute of Technology and Jan Youtie of the Georgia Tech Economic Development Institute. Funding has been provided by the Georgia Manufacturing Extension Partnership (GaMEP). The GaMEP is sponsored through the state government, is supported through federal and state investments and by program fee income, and is an affiliate of the U.S. Manufacturing Extension Partnership.

Present State of Japanese Corporations’ Strategic R&D Management Systems
National Institute of Science and Technology Policy (NISTEP), Japan

149 companies with more than ten billion yen (98 million euro) of R&D expenditures were included in the sample frame, using published data on 1990 R&D expenditures. An additional 12 companies with R&D expenditures over 7.5 billion yen (74 million euro) were also included, as a comparative element. The survey was conducted between December 1991 and January 1992.

Computerization and Company Correspondence to Social Change
Japan Institute of Labour (Japan)

The sample frame covered 2,200 companies in the private sector, including business services. The survey was conducted in 1996.

Survey on Personnel Policy Systems and Occupational Consciousness under Structural Adjustment
Japan Institute of Labour (Japan)

The sample frame covered companies in the private sector and was conducted in 1998.

Survey Into Organisational Changes and Computerisation (C01)
Service des Statistiques Industrielles (SESSI), France

Conducting institutions: This survey draws on close collaboration between Sessi, SCESS, Insee, DARES and the Studies and Employment Center. Previously, surveys in these themes were carried out separately among the enterprises (“Organisational Changes” survey by Sessi in 1993) and employees (“Techniques and Organisation Work” survey by DARES in 1987 and 1993).

Responsible scientists: Jean-Paul François, Florent Favre, Sessi, France and Nathalie Greenan, EEC

Funding institution: The conception was inspired by the works of an interdisciplinary seminar which brought together economists, sociologists and theorists in management, with the sponsorship of the General Commissariat for the plan.

Reference years: 1994 and 1997

Fraunhofer ISI Manufacturing Survey

Fraunhofer Institute for Systems and Innovation Research (Germany)

Conducting institution: Fraunhofer Institute for Systems and Innovation Research, Karlsruhe

Responsible scientists: Gunter Lay, Jürgen Wengel

Funding institution: Sampling data - self financed research of the institution

Analysis of data - various public and private contractors


University of Bochum (Germany)

Scientific survey financed by the German Research Council (DFG) in the context of a university research network on flexible manufacturing. Data is freely available for scientific purposes.

For 8 years the survey collected annual information on the enterprise level asking for data for specific facilities. Year of reference: the previous year, respectively.

Employee Participation in Organisational Change (EPOC)

European research group let by University of Warwick (EU)

Conducting institution: The questionnaire for the EPOC survey was drawn up by members of the EPOC research group, with the help of a team from the Industrial Relations Research Unit at the University of Warwick. INTOMART (representing GfK Europe) was commissioned to do the survey.

Funding institution: European Foundation for the Improvement of Living and Working Conditions
## 8.3 Overview of Surveys Reviewed

<table>
<thead>
<tr>
<th>Survey</th>
<th>Institution</th>
<th>Countries</th>
<th>Sectors</th>
<th>Year</th>
<th>Sample</th>
<th>Content</th>
<th>Depth</th>
<th>Impact</th>
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<tbody>
<tr>
<td>Flex-2: Change in Enterprise</td>
<td>Nutek</td>
<td>Sweden</td>
<td>all</td>
<td>1998</td>
<td>3360</td>
<td>multi focus</td>
<td>very differentiated</td>
<td>perceived and objective</td>
</tr>
<tr>
<td>Enterprises as Employers</td>
<td>Statistical Office</td>
<td>Finland</td>
<td>private sector</td>
<td>1996</td>
<td>2110</td>
<td>multi focus</td>
<td>very differentiated</td>
<td>perceived and objective</td>
</tr>
<tr>
<td>Flexibility in Working Life</td>
<td>Institute for Social Research/Statistical Office</td>
<td>Norway</td>
<td>all</td>
<td>1997</td>
<td>2130</td>
<td>multi focus</td>
<td>very differentiated</td>
<td>no impact indicators</td>
</tr>
<tr>
<td>Workplaces in Sweden</td>
<td>National Institute for Working Life</td>
<td>Sweden</td>
<td>all</td>
<td>1991/2</td>
<td>2135</td>
<td>multi focus</td>
<td>very differentiated</td>
<td>no information</td>
</tr>
<tr>
<td>The Flexible Firm</td>
<td>University of Aalborg (DRUID research group)</td>
<td>Denmark</td>
<td>private sector</td>
<td>1996</td>
<td>1900</td>
<td>single focus on organisational flexibility</td>
<td>very differentiated</td>
<td>objective</td>
</tr>
<tr>
<td>View from the Top</td>
<td>Manchester University (UMIST)</td>
<td>United Kingdom</td>
<td>top 1000 companies</td>
<td>1992/3</td>
<td>129</td>
<td>perception of change</td>
<td>general</td>
<td>no impact indicators</td>
</tr>
<tr>
<td>INNFORM</td>
<td>Oxford University et al</td>
<td>UK, US, NL, F, J, E, SE, CH</td>
<td>large, medium industry</td>
<td>1997</td>
<td>ca. 450</td>
<td>multi focus</td>
<td>very differentiated</td>
<td>objective (relative)</td>
</tr>
<tr>
<td>CIS-UK</td>
<td>Statistical Office</td>
<td>United Kingdom</td>
<td>industry</td>
<td>1997</td>
<td>2344</td>
<td>multi focus</td>
<td>general</td>
<td>objective (CIS)</td>
</tr>
<tr>
<td>Workplace Employee Relation Survey</td>
<td>Advisory Conciliation and Arbitr ary Service</td>
<td>United Kingdom</td>
<td>all (except agriculture, mining )</td>
<td>1990-1998</td>
<td>2188</td>
<td>multi focus</td>
<td>partly differentiated</td>
<td>perceived and objective</td>
</tr>
<tr>
<td>Quality Information Systems and Management survey</td>
<td>C. Forza, Vicenza</td>
<td>Italy</td>
<td>industry</td>
<td>1994</td>
<td>34</td>
<td>single focus on quality management</td>
<td>differentiated on quality</td>
<td>perceived and objective</td>
</tr>
<tr>
<td>Intra- and Inter-organisational routines</td>
<td>Universities Milano/ Mannheim</td>
<td>Italy/ Germany</td>
<td>machine building industry</td>
<td>1994</td>
<td>18</td>
<td></td>
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<tr>
<td>Organisation and its Evolution</td>
<td>Colombo/ Delmastro</td>
<td>Italy</td>
<td>metal industry</td>
<td>1989, 1997</td>
<td>438</td>
<td>single focus on organisation</td>
<td>very differentiated</td>
<td>objective</td>
</tr>
<tr>
<td>Supplier Involvement in New Product Development</td>
<td>Pisa University</td>
<td>Italy</td>
<td>3 sectors metal industry</td>
<td>1995</td>
<td>135</td>
<td>single focus on supra-organisational level,</td>
<td>differentiated on co-operation</td>
<td>perceived</td>
</tr>
<tr>
<td>Georgia Manufacturing Surveys</td>
<td>GeorgiaTech University</td>
<td>USA</td>
<td>manufactur ers</td>
<td>1994, 1996/7, 1999</td>
<td>1700, 1002, 778</td>
<td>multi focus</td>
<td>partly differentiated</td>
<td>objective</td>
</tr>
<tr>
<td>Study Title</td>
<td>Institute/University</td>
<td>Country</td>
<td>Sector</td>
<td>Year</td>
<td>Sample Size</td>
<td>Focus on R&amp;D Management/Organization</td>
<td>Differentiation in the R&amp;D Area</td>
<td>Data Availability</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>Present State of Japanese Corporations’ Strategic R&amp;D Management Systems</td>
<td>National Institute of Science and Technology Policy</td>
<td>Japan</td>
<td>private sector</td>
<td>1992</td>
<td>126</td>
<td>single focus</td>
<td>very differentiated</td>
<td>no information</td>
</tr>
<tr>
<td>Computerization and Company Correspondence to Social Change</td>
<td>Japan Institute of Labour</td>
<td>Japan</td>
<td>private sector</td>
<td>1996</td>
<td>558</td>
<td>multi focus</td>
<td>very differentiated</td>
<td>no information</td>
</tr>
<tr>
<td>Survey on Personnel Policy Systems and Occupational Consciousness under Structural Adjustment</td>
<td>Japan Institute of Labour</td>
<td>Japan</td>
<td>private sector</td>
<td>1998</td>
<td>N/A</td>
<td>Changes in corporate and work organization</td>
<td>varied</td>
<td>no information</td>
</tr>
<tr>
<td>Organisational Changes and Computerisation</td>
<td>Statistical Office</td>
<td>France</td>
<td>industry</td>
<td>1998</td>
<td>N/A</td>
<td>multi focus</td>
<td>very differentiated</td>
<td>almost no impact indicators</td>
</tr>
<tr>
<td>ISI Manufacturing Survey</td>
<td>Fraunhofer ISI</td>
<td>Germany</td>
<td>investment goods</td>
<td>1995, 1997, 1999</td>
<td>1305, 1329, 1442</td>
<td>multi focus</td>
<td>very differentiated</td>
<td>perceived and objective</td>
</tr>
<tr>
<td>NIFA Panel</td>
<td>University of Bochum</td>
<td>Germany</td>
<td>mechanical engineering</td>
<td>1991-1998</td>
<td>1700, (panel: 303)</td>
<td>multi focus</td>
<td>very differentiated</td>
<td>objective</td>
</tr>
<tr>
<td>Employee Participation in Organisational Change</td>
<td>EPOC research group</td>
<td>Europe</td>
<td>all</td>
<td>1996</td>
<td>5786</td>
<td>single focus participation</td>
<td>very differentiated</td>
<td>perceived</td>
</tr>
</tbody>
</table>