

Challenges of work organisation development in the knowledge- based economy

with a special reference to e-commerce

TNO Arbeid, Hoofddorp



TNO127068

Employment & social affairs



European Commission

Challenges of Work Organization Development in the Knowledge-Based Economy

- With a Special Reference to E-Commerce

**Thematic Paper
Presented to**

DG Employment & Social Affairs

By

**The European Work Organization Network
EWON**

**Prepared & Edited
by
Tuomo Alasoini**

TNO ARBEID
BIBLIOTHEEK
POSTBUS 718
2130 AS HOOFFDORP
TEL. 023-5549 468

Contributors:

Tuomo Alasoini, *Workplace Development Programme, Finland*
Steven Dhondt, *TNO Work & Employment, Netherlands*
Paul Oehlke, *DLR, Germany*
Giuseppe Roma, *CENSIS, Italy*
Aura Rua, *IDICT, Portugal*
Ayres de Sá, *IDICT, Portugal*

September 2001

NR. 47933
plaats 68-50

TABLE OF CONTENTS

1. CHARACTERISTIC FEATURES OF THE KNOWLEDGE-BASED ECONOMY2

2. NEW ORGANIZATIONAL LOGIC.....2

3. TRANSFORMATION OF JOBS AND EMPLOYMENT4

4. HIGH ROAD OR LOW ROAD OF INNOVATION, OR NO INNOVATION AT ALL?6

5. POLICY CHALLENGES9

5.1. WORK ORGANIZATION DEVELOPMENT IN PUBLIC POLICY.....9

5.2. PROGRAMME DESIGN AND IMPLEMENTATION.....10

1. Characteristic Features of the Knowledge-Based Economy

There has been a great deal of discussion in recent years about whether the technologically most advanced industrial nations are changing to a new type of economic growth. Specifically, the debate has gained momentum because of the economic growth and rising employment, which continued unabated in the USA throughout the 1990s without any significant inflationary pressure.¹ The main features of this new phase of economic development from the perspective of corporate operating environments can be captured as follows:

- The ability to create, process, store, transfer and protect knowledge has become an increasingly important source of competitive strength for companies. The growing knowledge intensity of products and operative processes in all sectors of the economy will lead to a blurring of the distinction between manufacturing and services, and ultimately to obliteration of the distinction.
- The ability to learn rapidly and develop constantly and to efficiently use this ability to generate constant product innovations has become the key success factor for an increasing number of enterprises. Their main developmental problem is no more rationalization within or optimization of the production process, but continuous optimization and development of the entire product concept.
- The new information and communications technologies (ICT), based on microelectronics, telecommunications and network-oriented computer software, hold a key role as economic growth engines. ICT is the technology base for the greater knowledge intensity of goods and services and also one of the factors which promotes companies to acquire improved capacity to learn, if only used in a way which combines its new possibilities with innovative forms of work organization and enhancing of skills of the workforce.

2. New Organizational Logic

Changes in the structure and growth dynamics of the economy are bringing about a transformation of enterprise organization, jobs and employment in advanced industrial nations. In the post-war decades, it was typical of major companies to strive for advanced vertical and horizontal integration. Horizontal integration was a means to seek growth by expanding into new sectors. Vertical integration, which was characteristic of the Fordist production model, was a means to internalize possible market risks in different phases of the value chains.

The globalization of competition, which is supported by the liberalization of trade and the deregulation of markets, and the development of ICT have, however, signified an end to the trends of horizontal and vertical integration. An increasing number of companies have chosen in recent years to focus on a narrower segment of products and of the value chain, around which they build their core competence. Horizontal disintegration is associated with the fact that when operations become globalized, there is less need for companies to balance their cash

¹ OECD: A New Economy? The Changing Role of Innovation and Information Technology in Growth. OECD, Paris 2000.

flow over economic cycles by betting on different industries; instead, balance can be sought through exploiting differences in regional markets. Another important reason for the increased horizontal disintegration is that amid tougher competition, management finds it hard to achieve competitive advantages in several sectors or product segments at once.

ICT helps rethink the Fordist production economic logic of vertical integration of the value chains by creating new possibilities to reshape them into new business areas. A good example of this kind of radical change during the recent years is the spreading of e-commerce along with the rapid development of the Internet.

E-commerce means “doing business over the Internet, selling goods and services which are delivered offline as well as products which can be ‘digitised’ and delivered online, such as computer software”.² In the OECD Economic Outlook (June 2000) it is expected that by the year of 2005 e-commerce transactions between businesses (B2B) and between businesses and consumers (B2C) will account for about 5 per cent of inter-company transactions and retail sales respectively. The biggest growth prospects of e-commerce are in B2B, in which companies expect efficiency gains especially in the form of lower procurement and inventory costs and better supply chain management. In the B2C domain, the biggest potentials are in the production of goods and services which can be digitised, thereby allowing substantial savings in production and delivery costs. Some authors³ see the spread of e-commerce as a major example of an application of Net technologies (the Internet, extranets, intranets), which signifies a fundamental shift in the economics of information. The Net technologies break the traditional trade-off between richness (bandwidth, customization, interactivity) and reach (connectivity) of information, opening up immense possibilities for deconstruction of the value chains in virtually all businesses. As companies start to expand the utilization of Net technologies in their operations beyond mere purchasing and selling of their products, it makes sense to start to talk of ‘e-business’, instead of ‘e-commerce’. Comprehensive shift to e-business may be accompanied in some companies not only with ‘webification’ of current business models or active search for new ones, but also with active search for new business opportunities and new paradigmatic ways of thinking about business.

Even though ICT technologies in many cases open up new possibilities to streamline individual value chains, the ruling principle behind the organization of value chains in the knowledge-based economy becomes horizontal coordination rather than vertical integration. According to the new organizational logic, core companies of the chains focus on their core competencies and outsource other activities, striving to retain responsibility only for the most strategic and economically most productive parts of the chain. They usually ‘go downstream’ in the value chain, closer to the client, with embedded and more comprehensive services and integrated solutions.

At the same time, the reshaping of value chains with the help of advanced ICT is leading to new kinds of cell-like organizational structures and networks of companies, with high levels of interdependence, and to redefinition of bargaining power relations between companies located in different parts of the chain. The core companies’ dependence on other companies in the supporting and related industries and associated services is growing to the extent that the real actors in the global innovation competition are not so much individual companies any

² OECD Economic Outlook No. 67, June 2000.

³ Evans, P.B. & Wurster, T.S.: Strategy and the New Economics of Information. Harvard Business Review Sep.-Oct. 1997, p.71-82.

more, but, increasingly, networks of companies or even entire clusters of industries, i.e. 'networks of networks'. The competitive position and the bargaining power of individual companies in the new environment is affected by the level of the knowledge they possess, how specific it is from the point of view of other companies, and its value for other companies.

3. Transformation of Jobs and Employment

There has been little empirical analysis so far of how these changes will affect jobs and employment. In an environment in which the main driving force of economic growth is the production, use and exploitation of knowledge, a special challenge for this kind of analysis is that it should link expected changes in the labour market to those in the market for the demand for and production of knowledge. From the point of view companies, this means that they are increasingly interested in the workforce as a generator of knowledge and not so much as a source of physical labour which, however, still remains the base of economic production and social reproduction.

Companies are now less than ever before tied by any physical and local resources and boundaries in their operations; they can utilize different sources of knowledge with the help of advanced ICT for the production of their products on a global scale and in an ever more flexible manner. The shift of emphasis in the utilization of workforce from a source of physical labour to a generator of knowledge has a built-in mechanism, which threatens to reinforce social segregation in the labour market. In the production of knowledge, the difference between the performance capacity of individual employees in terms of added value will grow almost infinitely, compared to the case in work based on physical tasks, where differences are smaller and somehow proportionate. There is thus an inherent trend towards a more uneven distribution of work, earned income, and other terms and conditions of employment.

In knowledge-based companies, which compete on the ability to generate constant product innovations, there is a continuous demand for people with versatile professional skills combined with international skills (such as language skills) and digital literacy, i.e. the ability to work in an environment which requires the use of ICT. Companies are now increasingly seeking new employees based on factors describing the work orientation as well. Companies typically assume that work orientation criteria – such as, quality consciousness, reliability, precision, care, commitment, trust, creativity, openness to new ideas, entrepreneurial spirit, enthusiasm, etc. – express an individual's potential for accumulating tacit knowledge, the significance of which as a source of competitive strength for companies is growing with networking and the increasing pace of change of their environment.⁴

In the new environment, the most strategic functions for the company are knowledge integration, and planning, coordination and control of the company's core activities. Such functions demand high levels of both explicit and tacit and company-specific knowledge. For this reason, knowledge-based companies strive to keep their most senior knowledge workers

⁴ Lundvall, B.-Å.: The Learning Economy. In OECD: Knowledge Management in the Learning Society. OECD, Paris 2000, p.125-141; Nonaka, I. & Teece, D.J. (eds.): Managing Industrial Knowledge: Creation, Transfer and Utilization. Sage, London – Thousand Oaks – New Delhi 2001.

committed through attractive arrangements, often involving ownership shares, share of profits, bonuses, fringe benefits and autonomy at work. The other side of the coin is the workforce less equipped with knowledge integration skills and the potential for accumulating tacit knowledge needed in the new environment for companies. Their labour market position is becoming increasingly insecure and volatile. Fragmentation of the labour market is associated with declining bargaining power of trade unions and works councils (or other respective forms of representative employee participation) and in some industrial nations also with erosion of the system of industrial relations and dismantling of the welfare state.

The spread of e-commerce is likely to have both direct and indirect impacts on labour markets and the composition of employment. Internet penetration is substantially higher among large than small companies and there is the danger that many small companies lack the skills and financial resources needed to make comprehensive use of the Net technologies. The skills deficit of small companies is probably bigger in the B2C domain than in B2B, where, for example, the demands for specialized marketing skills are not as high and where there is more room for specialized niche businesses. On the other hand, the rapid development of Net technologies is speeding up establishment of offensive, growth-oriented firms with lean and cost-efficient organizational structures for whom the Internet is the only marketplace and who build their whole business concept accordingly. Companies with a holistic e-business concept need people with high knowledge integration skills and with special skills, such as software development and programming, graphics design, content provision, and ICT-mediated customer service, sales and marketing. The increased possibilities for digitisation of products and for streamlining of logistics chains will probably lead to a decreased demand for 'traditional' sales staff in businesses like retail trade, insurance and travel agencies as well as in packaging, distribution and storage. For instance, a Finnish expert study⁵ assesses that in the provision of simple, routine-like services it is possible to achieve even tenfold improvement in productivity by transferring the delivery online. In standardized services, but with a limited number of options available to the client, the potential for improvement was assessed to be two- or threefold, whereas in highly customized services the study considered the opportunity to provide them online to be rather poor, with not much room for the improvement of productivity. This example strikingly shows how the impacts of ICT and e-commerce vary greatly from individual case to case, making it difficult to draw firm conclusions on their effects on macro level.

Changes in the structure and growth dynamics of the economy are not unproblematic from the point of view of the workforce with high-level knowledge integration skills, either. As the key generators of added value for the company, they are exposed to continuous pressure for innovation, learning, professional development and showing of their commitment and value-creating capacity to the company. With globalized competition and advanced ICT, work of the highly skilled knowledge workers is becoming more virtual and mobile. New forms of ICT-mediated working (called as 'teleworking', 'e-working', 'virtual working', 'mobile working', etc.) unchain work from the traditional boundaries of time and space. This opens up knowledge workers better opportunities for autonomy, self-regulation and work-life balance, on the one hand, but leaves them more vulnerable to ever increasing performance and innovation pressure in the form of excessive work load and working hours, on the other hand. In practice, highly skilled knowledge workers often find it difficult to control the boundaries

⁵ Järvelä, P., Lankinen, M., Seppänen, I. & Tinnilä, M.: Scenarios for Electronic Service Provision (in Finnish). Finnish Ministry of Labour, ESF Publications 87/01, Helsinki 2001.

between work and personal lives, despite the fact that they usually enjoy more autonomy at work and have better chances of flexible working arrangements than the other groups of employees. Accordingly, there is empirical evidence that the incidence of stress increased during the past decade in many OECD countries.⁶

4. High Road or Low Road of Innovation, or No Innovation at All?

The increased pressure on company management by globalized competition and the demands of impatient stock markets for showing constantly improving shareholder value makes it attractive for management to follow a strategy, which puts the major emphasis on seeking competitive advantage by means of cutting costs. Focusing on cost competition directs management's attention to raising of operational effectiveness through continuous process improvement, often accompanied with a streamlined work organization with no slack resources, numerical flexibility in the use of labour, no organized skills development, and utilization of ICT mainly as a tool for further automation and centralized control.

Though nearly 50 per cent of employees in the EU Member States already use computers in their work, only half of them had got special training to that.⁷ There are many reasons for the weak incentive of firms to make investments in vocational training of their employees at large in an environment of cutthroat competition. Companies aiming at systematic rationalization of their processes often limit training only to a carefully selected core group of employees working in the most strategic knowledge integration functions and occupations. Holistic company-wide policies to enhance the working capacity, skills and creativity of employees and, thus, their employment opportunities, would often be too risky from a company's point of view. Moreover, many companies, especially SMEs, lack the knowledge and capacity in the area of design of work and technology. This lack of knowledge contributes to an orientation to company development, which can be called as the 'low road of innovation'.⁸ The low road development path may lead to sound productive and financial performance in the short term, but there is the danger that it undermines the formation of social capital within the company and the mobilization of human resources in support of company goals, which are major preconditions for longer-term knowledge-generation and innovation capacity of the company.

There are also companies, which follow an alternative path of development, i.e. the 'high road of innovation'. High-road companies seek competitive advantage primarily from quality, customization and balanced process and product innovation, supporting this by structural redundancy of resources, functional flexibility in the use of labour, broad participation of employees, and genuinely team-based forms of work organization which foster learning and skills development of employees. These companies look to advances of ICT with a view to releasing the productive and innovative potential of the employees rather than for control and

⁶ Gabriel, P. & Lämätäinen, M.-R.: *Mental Health in the Workplace: Introduction*. ILO, Geneva 2000.

⁷ Commission of the European Communities: *Benchmarking Report Following-Up the 'Strategies for Jobs in the Information Society'*, CEC (2001) 222, Brussels 2001.

⁸ European Work & Technology Consortium: *Work Organisation, Competitiveness, Employment: the European Approach*, European Commission, DG for Employment and Social Affairs, CE-V/8-98-001-EN-C, 1998.

automation purposes. They view knowledge generation as a process calling for active involvement on the part of the entire staff.

There is ample empirical evidence in support of the argument that companies, which have adopted new work, organizational and human resource management practices as ‘bundles’, have been able to achieve significant benefits in both productive and financial performance.⁹ The problems with accurate definition and measurement of these practices make it difficult to provide statistically representative data on their diffusion in Europe. Many studies demonstrate, however, that companies following a determined innovation strategy, whether the high road or low road, are still relatively thin on the ground:

- The data of the EPOC Survey (Employee direct Participation in Organizational Change) by the European Foundation for the Improvement of Living and Working Conditions on 10 EU countries stated that 33 per cent of the responding organizations (N=5,768) used group delegation. However, only less than 4 per cent of all workplaces were characterized as proper ‘team-based organizations’ with a high coverage and intensity of group delegation.¹⁰
- The EPOC Survey also showed that the number of workplaces reporting no activity for ‘downsizing/back to core business’ was 69 per cent, for outsourcing and subcontracting 78 per cent, for working time flexibility 63 per cent, and for contract flexibility (part-time work or temporary contracts) 66 per cent. 30 per cent also reported no innovation in their products or technology.¹¹
- The Nordflex Project studied the spread of modern, flexible work organizations in Denmark, Finland, Norway and Sweden (N=c. 6,000). The study grouped workplaces as ‘front-runners’ if they had a high degree of decentralized responsibility and a system of organized human capital development, and used teams, job rotation and a compensation system based on results or quality. In Denmark, Finland and Sweden, only 13 per cent of the private-sector workplaces fulfilled all the five criteria, and in Norway the share remained as low as 5 per cent.¹²

⁹ E.g. Antila, J. & Ylöstalo, P.: Functional Flexibility and Workplace Success in Finland. Finnish Ministry of Labour. Labour Policy Studies 206. Helsinki 1999; Appelbaum, E., Bailey, T., Berg, P. & Kalleberg, A.L.: Manufacturing Advantage: Why High Performance Work Systems Pay Off. Cornell University Press. Ithaca, NY 2000; Cully, M., Woodland, S., O'Reilly, A. & Dix, G.: Britain at Work: As Depicted by the 1998 Workplace Employee Relations Survey. Routledge. London – New York 1999; Goudswaard, A. & Dhondt, S.: The Changing World of Work in the Netherlands. TNO. Hoofddorp 1999; Huselid, M.A.: The Impact of Human Resource Management Practices on Turnover, Productivity, and Corporate Performance. *Academy of Management Journal* 38 (1995):3, p.635-672; Ichniowski, C., Shaw, K. & Prennushi, G.: The Effects of Human Resource Management Practices on Productivity: A Study of Steel Finishing Lines. *American Economic Review* 87 (1997):3, p.291-313; Lay, G., Shapira, P. & Wegel, J. (eds.): Innovation in Production (Technology, Innovation, and Policy) No 8. 1999; MacDuffie, J.P.: Human Resource Bundles and Manufacturing Performance: Organizational Logic and Flexible Production Systems in the World Auto Industry. *Industrial and Labor Relations Review* 48 (1995):2, p.197-221; NUTEK: Flexibility Matters – Flexible Enterprises in the Nordic Countries. NUTEK B 1999:7. Stockholm 1999; Whittington, R., Pettigrew, A., Peck, S., Fenton, E. & Conyon, M.: Change and Complementarities in the New Competitive Landscape: A European Panel Study, 1992-1996. *Organization Science* 10 (1999):5, p.583-600.

¹⁰ Benders, J., Huigen, F., Pekruhl, U. & O'Kelly, K.P.: Useful but Unused – Group Work in Europe. European Foundation for the Improvement of Living and Working Conditions. Dublin 1999.

¹¹ EPOC Research Group: Employment through Flexibility – Squaring the Circle? European Foundation for the Improvement of Living and Working Conditions. Dublin 1999.

¹² NUTEK, op. cit.

- The Workplace Employee Relations Survey of 1998 studied the spread of new forms of work organization at British workplaces. The data (N=2,191) showed that even though teamworking in one form or another was quite widespread, only 3 per cent of all workplaces operated teams that corresponded to a model of 'fully autonomous teamworking' where teams also decide how work is to be done and appoint their own team leaders.¹³
- The INNFORM Project was based on a survey on large and medium-sized firms in the United Kingdom, Germany and other Western European countries (N=459). Though many companies in Europe changed their organizational structures, processes or boundaries during the course of the panel study from 1992 to 1996, only very few of them adopted changes in all three dimensions. According to the authors, "it seems that holistic or systemic transformation is still very rare, involving fewer than one in twenty European firms".¹⁴

E-commerce and e-business are business innovations as such. There are many reasons to believe, however, that deployment of the Net technologies in companies' business processes has been associated so far more often with the low-road than the high-road alternative. Because the Internet reduces the importance of physical location, it lowers the barriers to entry for new competitors, intensifying thus the rivalry in the market and at the same also making it more difficult for companies to differentiate themselves. The outcome is a greater pressure for companies to engage in mere price competition. The trend to competing solely on price is reinforced also by the fact that the Internet applications companies deploy are very similar, often drawing on generic packages offered by third-party developers. The Internet as such is, however, an extremely flexible technology. Internet architecture and standards make it possible to build also truly integrated and customized systems, which would allow companies to follow quality- and customer-oriented strategies in line with the high-road concept of innovation.¹⁵

There is no clear pattern in the adoption of 'bundles' of flexible and innovative work, organizational and human resource management practices across countries, industries or workplaces in Europe. The reported incidence of these practices is somewhat higher in Northern Europe than in the Southern parts of Europe. It also seems that SMEs, which constitute the great majority of all enterprises in Europe, are lagging behind large enterprises in adopting these practices.

The main policy issue facing European policy makers does not seem to be the choice between the high road or low road of innovation, but between innovation of any kind or no innovation at all. Given the growing knowledge intensity of the economy, globalization of competition and the new possibilities opened up by advanced ICT, there is the danger that a growing number of European workplaces are not sufficiently prepared to the challenges of the knowledge-based economy and, consequently, will be stuck into traditional markets with no reasonable growth prospects and doomed as laggards in the global innovation competition.

¹³ Cully et al., *op. cit.*

¹⁴ Whittington et al., *op. cit.*

¹⁵ Porter, M.E.: Strategy and the Internet. Harvard Business Review Mar./2001, p.63-78.

5. Policy Challenges

Work organization development is an area in which single European-wide approaches, let alone practical solutions or institutional arrangements, are difficult to find, owing to national differences in social values, industrial structures, framework conditions, industrial relations, etc. This is one of the main conclusions of a recent survey on government support programmes for new forms of work organizations in EU Member States.¹⁶

Advance of the knowledge-based economy is, however, leading to a situation in which companies and company networks as well as regions and nations are facing an increasingly globalized competition on innovation and productivity development. A major policy challenge for Europe is to turn the diversity, but at the same time the rich variety, of national approaches, programmes and experiments in the area of work organization development into a fresh innovation- and productivity-supporting framework through comprehensive dialogue between governments, the social partners, R&D institutions, workplaces and all other possible stakeholders. This dialogue between stakeholders would serve achieving of the strategic goal set up for Europe at the Lisbon European Council in March 2000, namely that Europe should “become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion”.

Europe-wide interactive approach to work organization development must be supported by establishing and strengthening sufficient social infrastructure for the creation and dissemination of knowledge on work organization. Today, there are still many shortcomings in the infrastructure, which render the dialogue difficult.

5.1. Work Organization Development in Public Policy

The status given to work organization development issues in public policy decision-making is a major determinant of governments’ room for manoeuvre to influence change in workplaces.

- There is an urgent need to adopt a holistic and systemic view on innovation in public policy, which focuses on technological and organizational (and other social) innovations alike and on supporting the integration between the ‘new’ and ‘old’ economy, instead of seeing ‘modernization’ of the economy primarily as the development of new cutting-edge technologies. In this policy framework, work organization development should constitute an integrated and well-established aspect of the new broadly-defined innovation policy.
- The social partners play a key role in creating an atmosphere of trust in which a shared understanding of the importance of work organization development is possible to generate in workplaces and in the society at large. Governments can foster dialogue between the social partners and help solve the problems that may threaten to dry it up. Cross-national collective bargaining and other new elements in the agenda of European industrial relations may be utilized as means of broadening the scope for this dialogue in Europe.

¹⁶ Business Decisions Limited: Government Support Programmes for New Forms of Work Organisation: A Report for DG Employment & Social Affairs. Office for Official Publications of the European Communities. Luxembourg 2000.

- Counteracting the inherent trend towards a growing social segregation in the knowledge-based economy is a major challenge for governments in creating socially and ethically sound conditions for publicly supported work organization development programmes. This calls for, in particular, building of flexible systems of further training and other forms of support for skills development, measures to promote the maintenance of working capacity of the workforce, and creation of sufficient social networks for those in the danger of exclusion from the labour market as well as systems of monitoring problems of the quality of working life and employee well-being at work.
- Governments should target sufficient resources to raising public awareness on the benefits of new forms of work organization on both companies and employees alike in the changing context of competition where the role of knowledge generation and innovation is growing in importance. Means to raise awareness may range from mere dissemination of information through newsletters, databases and campaigns or encouraging workplaces, R&D institutes and the social partners to launch activities of their own to funding and coordinating work organization development programmes proper.

5.2. Programme Design and Implementation

At the outset the focus of work organization development programmes was typically on problems arising from Taylorist working arrangements being taken to extremes, such as the ergonomic and psychological problems of repetitive and monotonous work and the lack of autonomy and influence at work. Even though these and many of the other 'old' problems of Taylorism are still a relevant object of development in many European workplaces, in the environment of the knowledge-based economy the starting points for work organization development programmes have become more complex.

- The real actors in the knowledge-based economy are increasingly networks of companies and not so much individual companies any more. The focus of programmatic development on work organization should shift, accordingly, from the level of individual workstations or working units to cover company- and network-level issues as well, calling for new conceptual frameworks and developmental models.
- Due to this change of context and focus, it becomes increasingly difficult to find ready-made expert solutions, standards or 'best practices' to the new problems and development needs facing companies and their employees in the knowledge-based economy. Acquiring the sufficient expertise to successfully deal with these ever more complex issues in programme design and implementation calls for combination of different kinds of expertise, achieved only through broad dialogue between all relevant actors, whether researchers or practioners.
- At best, work organization development programmes can become important forums for exchanging information and experiences on 'good practices' between different kind of workplaces and other actors. Achieving the 'critical mass' of workplaces and other actors such as R&D institutes with sufficient diversity is a major factor fostering opportunities for interactive learning within the programme frameworks. Special attention in programme design and implementation with respect to interactive learning should be paid to involving

also industries, regions and workplaces, which are lagging behind in terms of ICT and work organization development infrastructure.

- Operating in an increasingly networked and dynamic environment will grow the risk that programmatic development is not focusing on 'correct' and the most actual problems in working life, or that it may be providing 'obsolete' solutions to them, possibly with even negative externalities. Work organization development programmes, therefore, need greater sensitivity in monitoring the effects of programmatic activities and the flexibility to make any necessary redefinitions of their content and forms. Areas in the environment of the knowledge-based economy which require particular sensitivity from monitoring will be ensuring the participation of employees, preventing processes of social segregation, or even exclusion, recognizing new emerging problems in working life, and pre-empting ecological risks in connection with change.

