KNOWLEDGE, WORK ORGANISATION AND ECONOMIC GROWTH - AN OUTLINE

(Note by the Secretariat)
NOTE BY THE SECRETARIAT

This is an outline of work which is being undertaken as part of the horizontal project on economic growth. The focus of this work is on the labour market dimensions of the so-called "New Economy", with particular emphasis on the challenges posed by the New Economy regarding labour practices and industrial relations, the trade-off between job stability and the need for an enhanced degree of firm adaptability, and the role of human capital development at the firm level.

Delegates are invited to comment on the outline and to provide guidance on the key issues that should be examined in this work.
KNOWLEDGE, WORK ORGANISATION AND ECONOMIC GROWTH - AN OUTLINE

A. Introduction

1. There is considerable debate over whether OECD countries are on the eve of an era of higher non-inflationary growth - the so-called New Economy. According to some analysts, the adoption of information and communication technology (ICT), combined with increased economic integration among countries, is transforming economic systems, much like the “electricity revolution” in earlier episodes of the development process.

2. It is still too early to assess whether these sanguine predictions will materialise. There is some evidence that the economic performance of the United States is exceptional, but this is far from being the case in most other OECD countries. It is clear that the diffusion of ICT has created new business and employment opportunities, while holding the promise of higher productivity gains. But for these potential benefits to materialise, a well-functioning labour market must be in place. It is indeed essential that labour resources are mobilised — there is still substantial under-employment in many OECD countries. In addition, workers’ skills need to be adapted to ICT requirements. Finally, to use ICT effectively, firms have to adapt work organisation practices, which entails changes in the content of jobs as well as in working conditions. More generally, the right policies and institutions must be in place for the New Economy to become a reality.

3. The purpose of this project is to discuss how labour market policies and institutions can contribute to enhance economic growth in the new economic context characterised by the rapid diffusion of ICT and increased international competition. More specifically, the project: a) reminds that, in most OECD countries, problems of under-employment and job insecurity remain acute, which shows that “old” policies aiming at enhancing labour utilisation should continue to be pursued; b) identifies emerging patterns in OECD labour markets, notably as regards the role that knowledge and new forms of work organisation play in the changing economic environment; and, c) discusses the policy issues raised by these emerging patterns.

B. Uneven labour market developments in OECD countries

4. Discussions about the New Economy should not divert attention from the fact that many OECD countries continue to suffer low rates of labour utilisation. Though in the United States and most Nordic countries the employment population ratio exceeds 70 per cent, the figure is less than 60 per cent in many other OECD countries.

5. There is evidence that countries most successful in creating employment are also those where multi-factor productivity has grown faster, thereby confirming that there is no trade-off between productivity gains and job creation, but a mutually-reinforcing relationship. Policies that encourage the labour market participation of would-be workers, such as make work pay systems and effective active labour market programmes, should therefore continue to rank high in the policy agenda. More generally, the labour market policy framework continues to be relevant in the New Economy, even though, as
discussed in the other Parts of the project, certain elements of the framework can be posed in different terms and priorities may be rethought.

C. The growing role of knowledge

6. Human capital is widely regarded as a major factor behind economic development, and its importance has grown with the diffusion of ICT. To illustrate this positive relationship, this Part looks at one particular dimension of human capital, namely knowledge. It is indeed sometimes argued that developed countries have experienced in the last decades a transformation in which knowledge has become a central element for the organisation and development of economic and social activities.

1. Knowledge and economic growth: theory and empirical evidence

7. There are several reasons why knowledge influences economic growth. First, facilitated by the increased use of ICT, knowledge is diffused more rapidly and widely than ever in the past. The result is that the economic externalities associated with knowledge have considerably increased. Second, today’s economy is dominated by services where intangibles play an important role, and knowledge is one of the key intangibles.

8. To the extent that knowledge plays a more important role in economic systems, the demand for workers that generate ideas and knowledge (i.e. “knowledge workers”) will rise. Therefore, in order to grasp the statistical importance of knowledge for economic growth, it is useful to examine recent changes in occupational patterns based on a conceptual framework developed by Wolff and Baumol (1989) and applied to the Canadian labour market by Lavoie and Roy (1998). See Annex for a detailed classification of occupations. According to this framework, occupations can be categorised into two main groups: non-information workers and information workers, the latter being divided into two sub-categories, namely those manipulating information (data workers) and those generating ideas (knowledge workers).

9. Preliminary findings suggest that the number of knowledge workers, as defined above, has indeed increased markedly over the last few years. In the United States alone, between 1990 and 1998, the number of knowledge workers rose by almost 2.5 million, that is over 18 per cent of the net employment gains recorded during this period. Among the knowledge-intensive occupations, computer specialists have recorded the largest employment opportunities, but the number of jobs under other knowledge-intensive occupations has also increased sharply. Interestingly, a similar phenomenon can be observed in other OECD countries (Table 1).

10. Importantly, in the United States, the wage of knowledge workers has risen much faster than is the case for the other occupations, suggesting that demand forces are the main factor at work (Chart 1).

11. It could be argued that the dynamism of knowledge-intensive employment simply reflects higher educational requirements. True, there is evidence that the majority of American knowledge workers have a high level of educational attainment. But one third of them have not reached a university degree, suggesting that on-the-job experience plays an important role as well.

12. It will also be interesting to explore more direct relationships between knowledge and growth. For instance, the expectation is one of a positive association across sectors (and countries) between the incidence of knowledge workers and productivity gains. In the case of the United States, preliminary analysis suggests that such a correlation is indeed present, but more work is needed to confirm these initial findings and extend them to other countries.
2. **Policies to encourage knowledge accumulation and its diffusion**

13. The above discussion would underline the importance of policies that enhance human capital, in the areas of education and training. It also raises the complex issue of whether migration policies can be used as a tool to tackle emerging shortages of knowledge workers.

14. Within efforts undertaken by OECD governments to upgrade educational attainment, a priority has been given to the Internet and communications skills. But the issue arises whether these efforts will match the requirements of the knowledge-based economy. Some authors have stressed the need for enhanced coherence between technology policies (which tend to raise the demand for occupations such as scientists) and education policies (which shape the supply-side), otherwise skill shortages will intensify (Romer, 2000).

15. Evidence suggests that on-the-job experience is another characteristic of knowledge workers, highlighting the need for supplementing education with firm training. However, in the new environment characterised by a high degree of turnover of knowledge workers, the market incentives for training are weak. The result is that firms will tend to pursue a “buying strategy”, seeking to recruit already skilled workers (at high wages), instead of upgrading the skills of the existing workforce. This raises issues of how training policies can be adapted to the new environment, how firms can retain knowledge workers and whether migration policies can help alleviate skill shortages:

- Given the increasing difficulties encountered by firms to retain their workers, systems that encourage individuals to invest in their human capital can be strengthened. If firms decide not to train their workers, employability becomes a purely individual concept. This section will explore different options such as enhancing systems of training certification, and providing vouchers to individual workers.

- Firms have tried to retain knowledge workers by developing new incentives. These include financial compensation mechanisms, such as performance bonuses, stock options, royalty fees and participation in firm profits. Non-cash benefits are also provided, in the form of childcare and other work and family policies, flexible hours, telecommuting, extra holidays and access to social facilities. Issues of how government policies should treat these systems, notably for tax and social security purposes, have been raised.

- In some OECD countries, notably the United States, shortages of knowledge workers are sometimes addressed by having recourse to foreign labour. Different opinions have been expressed regarding these practices. Some consider that migration of highly skilled personnel provides an important channel to fill in skill shortages. Others see this as a failure of education and training policies. They think that the correct way to address skill shortages is through these policies, otherwise there would be a risk of “brain drain” from other countries, in particular developing ones.

D. **Emerging workplace practices – grasping the benefits of ICT**

16. Enhancing the supply of “knowledge workers” in order to match demand requirements is essential to exploit the full benefits of new technological opportunities, but changes in workplace practices are also needed. Some authors argue that the so-called “Solow-Paradox” (i.e. the observation that, until recently, new technology had not translated into productivity gains) was due to an insufficient response of work organisation systems to the adoption of ICT (Askenazy, 1999). It seems that this is changing. An increasing number of firms implement new workplace practices, which is one of the facets of the New Economy (Black and Lynch, 2000). In order to shed light in this debate, the purpose of this Part is a) to
describe the trend-rise in the number of firms adopting new workplace practices; b) to show that the adoption of these practices is often related to the introduction of ICT while, more importantly, increasing firm performance; and c) to discuss policy implications arising from the analysis.

1. The rapid diffusion of new workplace practices

17. New workplace practices encompass, inter alia, a relatively high degree of labour-management co-operation, flatter management structures and increased recourse to team work. The main objective of these practices is to enhance functional as well as numerical flexibility, in the face of rapid economic and technological changes. This report will provide evidence on the growing number of firms that adopt these new workplace practices - at least in the limited number of countries for which the relevant data are available.

2. New workplace practices and economic performance

18. This section examines the impact of the diffusion of new workplace practices on micro- and macro-level performance. Studies have empirically verified the direct contribution of new workplace practices on productivity performance at the firm level, especially in the case of the United States. New workplace practices also have an indirect economic effect in that they create the enabling environment for ICT to be implemented effectively (Table 2). Firms with new workplace practices tend to use information technology more intensively than others, while several studies have already verified the positive correlation between ICT and productivity performance (see Box).

19. In addition, it should be stressed that the adoption of new workplace practices goes hand-in-hand with changes in labour compensation, training and labour practices, which may alter wage distribution and job stability in a significant way, with potentially large economy-wide effects. Firms adopting more intensively new workplace practices are also more prone to invest in formal vocational training and they use new incentive schemes such as profit sharing and stock options more frequently than is the case of other firms. Also, it seems that the adoption of new workplace practices is associated with a relatively intensive use of outsourcing and non-standard forms of employment.

Box. Selected empirical studies on the impact of new workplace practices on firm performance

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Main findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Evidence for the United States</td>
<td>“High commitment” systems (encompassing flexible job design, formal training programs, formal communication systems and internal promotion) enhance firm productivity and Tobin’s q.</td>
</tr>
<tr>
<td>Ichniowski (1990)</td>
<td></td>
</tr>
<tr>
<td>Ichniowski, Shaw &amp; Prennushi (1997)</td>
<td>Compared with “traditional” systems (with no innovative practice), firms adopting new workplace practices, such as incentive pay, teamwork and flexible job assignment schemes, yield high levels of productivity and product quality.</td>
</tr>
<tr>
<td>Huselid &amp; Beker (1996)</td>
<td>Firms that change organisational structures via employee skill development schemes and the adoption of performance pay systems enjoy higher rates of return than other firms, even correcting for possible firm-specific bias.</td>
</tr>
</tbody>
</table>
Black & Lynch (1997)  
The development of institutions that promote employees’ voice in the firm influences productivity positively, the effect being higher than is the case of Total Quality Management.

Black & Lynch (2000)  
Positive correlation between new practices (labour-management meetings, re-engineering and profit sharing schemes) and labour productivity but weak statistical significance. Positive and significant correlation between new practices and wages.

Kelly (1996)  
Plants with strong employee involvement are more productive than other plants, especially when employee involvement is combined with the use of computer-controlled machines.

Cappelli & Neumark (1999)  
Similar results as Black & Lynch (2000). A correlation is found between sales per worker and new workplace practices.

Bryson (1999)  
Whether a method of EI (Employee Involvement) enhances firms’ financial performance or not depends on the array of other EI and non-EI practices in operation.

**Evidence for others OECD countries**

Greenan (1996a, 1996b)  
(France)  
Classifying firms into 4 groups of organisational system (according to the degree of decentralisation of decision-making and communication structure), a weak impact of different organisational systems on productivity is found.

Among the UK non-union establishments, changes in employee involvement are positively correlated with labour productivity growth and employment changes. Among union establishments, the correlation is often negative. In the case of Germany, a positive and significant correlation is found between the presence of works’ councils and labour productivity among establishments with more than 100 employees.

In Denmark a positive, but marginally significant, correlation between new workplace practices and productivity is found. In the case of Swedish manufacturing industries, the correlation is positive and significant. In Finland, firms that have adopted new workplace practices have, on average, relatively high productivity.

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### 3. Policy challenges raised by the adoption of new workplace practices

20. To the extent that adopting new workplace practices helps improve firm performance, it is legitimate to ask why these practices are not embraced more rapidly. One possible explanation is that introducing new workplace practices requires a reorganisation of firms, which is both time-consuming and costly. In addition, certain categories of workers and managers may feel insecure about the new practices — this is especially the case when they lead to a downsizing of the firm, or when layers of management are suppressed. Even though these perceptions might be unjustified, insecure workers and managers will tend to oppose change. Several policy avenues can be explored to tackle these resistances:

- Questions have been raised regarding the ability of existant labour-management institutions to reduce obstacles to change. Institutions where workers' voice is expressed (for example, works councils) can
help build high-skill, high-trust firms. For instance, such institutions enhance employees involvement on training matters either to increase overall intensity of training or to distribute more evenly training opportunities among different category of workers. On the other hand, others argue that innovation in workplace practices calls for a change in the traditional forms of representation of employers and workers. In this regard, it is interesting to note that, in some countries, changes in workplace practices have given rise to non-union forms of labour-management institutions.

- Reducing some of the barriers (and costs) to employment mobility can also be considered. It is particularly important to ensure that pension benefits are portable. More fundamentally, the right policy balance between employment security and the need for adaptability needs to be found. This raises the issue whether there is a need for reforming employment regulations in the New Economy context.

- The success of technological and organisational processes depends to a large extent on the ability of individuals to absorb change. It goes without saying that a well-functioning training system is of paramount importance in this respect.
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“Should the government subsidise supply or demand in the market for scientists and engineers?” NBER Working Paper 7723, June.

WOLFF, E.N. and BAUMOL, W.J. (1989)
### Table 1. Number of knowledge workers in OECD countries, 1992-1999

<table>
<thead>
<tr>
<th></th>
<th>Share in total employment (%)</th>
<th>Change in the number of knowledge workers (000s)</th>
<th>Change in total employment (000s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>.</td>
<td>14.8</td>
<td>.</td>
</tr>
<tr>
<td>Belgium</td>
<td>17.9</td>
<td>21.4</td>
<td>55</td>
</tr>
<tr>
<td>Denmark</td>
<td>15.8</td>
<td>18.7</td>
<td>23</td>
</tr>
<tr>
<td>Finland</td>
<td>.</td>
<td>25.4</td>
<td>.</td>
</tr>
<tr>
<td>Greece</td>
<td>10.5</td>
<td>10.8</td>
<td>-27</td>
</tr>
<tr>
<td>Ireland</td>
<td>13.0</td>
<td>14.9</td>
<td>9</td>
</tr>
<tr>
<td>Italy</td>
<td>12.7</td>
<td>15.9</td>
<td>149</td>
</tr>
<tr>
<td>Netherlands</td>
<td>21.4</td>
<td>24.0</td>
<td>16</td>
</tr>
<tr>
<td>Portugal</td>
<td>9.5</td>
<td>7.9</td>
<td>12</td>
</tr>
<tr>
<td>Spain</td>
<td>8.4</td>
<td>11.8</td>
<td>147</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>16.5</td>
<td>17.1</td>
<td>26</td>
</tr>
<tr>
<td>United States</td>
<td>11.0</td>
<td>11.7</td>
<td>1149</td>
</tr>
</tbody>
</table>

.. Data not available.


Table 2. **New workplace practices, ICT and training**

- **A - Implementation of new workplace practices and use of computers, United States, 1996**
  
  Average percentage of non-supervisory workers using computers by type of firm

<table>
<thead>
<tr>
<th>Type of the practice</th>
<th>Firms which implement a new practice</th>
<th>Firms which do not implement new practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benchmarking</td>
<td>63.9</td>
<td>48.5</td>
</tr>
<tr>
<td>Re-engineering</td>
<td>59.2</td>
<td>48.3</td>
</tr>
<tr>
<td>Autonomous team</td>
<td>64.1</td>
<td>47.8</td>
</tr>
<tr>
<td>Regular meetings about work-related issues</td>
<td>57.1</td>
<td>46.1</td>
</tr>
</tbody>
</table>

*Source*: Education Quality of Workforce, National Employer Survey 1997.

- **B - Implementation of new workplace practices and adoption of IT, European Union, 1994-96**
  
  Percentage of firms which have taken initiatives to adopt new IT

<table>
<thead>
<tr>
<th>Type of the practice</th>
<th>Firms which have implemented a new practice</th>
<th>Firms which have not implemented new practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flattening managerial levels</td>
<td>43.6</td>
<td>35.8</td>
</tr>
<tr>
<td>Back to the core business</td>
<td>43.2</td>
<td>36.2</td>
</tr>
<tr>
<td>Employee involvement</td>
<td>52.7</td>
<td>30.0</td>
</tr>
<tr>
<td>Team-based organisation</td>
<td>53.5</td>
<td>31.5</td>
</tr>
<tr>
<td>Job rotation</td>
<td>51.5</td>
<td>35.4</td>
</tr>
</tbody>
</table>

*Source*: Survey of Employee Direct Participation in Organisational Change

- **C - Implementation of new workplace practices and vocational training, the United States, 1996**
  
  Percentage of firms which pay for formal vocational training

<table>
<thead>
<tr>
<th>Type of the practice</th>
<th>Firms which implement a new practice</th>
<th>Firms which do not implement new practice</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benchmarking</td>
<td>90.7</td>
<td>66.8</td>
</tr>
<tr>
<td>Re-engineering</td>
<td>75.4</td>
<td>70.7</td>
</tr>
<tr>
<td>Autonomous team</td>
<td>82.5</td>
<td>69.2</td>
</tr>
<tr>
<td>Regular meetings about work-related issues</td>
<td>80.0</td>
<td>64.0</td>
</tr>
</tbody>
</table>

*Source*: Education Quality of Workforce, National Employer Survey 1997.
Chart 1.

Real hourly earnings by group of occupations in the United States$^a$

Average annual growth, 1985-1998

Both sexes

Good producing workers: -0.2
Data workers: 0.5
Management workers: 0.7
Services workers: 0.9
Knowledge workers: 1.2
Average: 0.4

$^a$ Real hourly earnings are calculated as nominal hourly earnings deflated by the private consumption deflator. 
### Annex. Classification of occupations in the knowledge-based economy

<table>
<thead>
<tr>
<th>Type of workers</th>
<th>US classification</th>
<th>ISCO-88(COM) classification (3-digit level)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <strong>Knowledge workers</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Computers</td>
<td>Mathematical and computer specialists (64-68) Computer technicians (213,229 and 233) Computer equipment operators (308-309)</td>
<td>Computing professionals (213) Computer associate professionals (312)</td>
</tr>
<tr>
<td>2. <strong>Management workers</strong></td>
<td>Executive, administrative and managerial occupations (3-37)</td>
<td>Legislators and senior officials (111, 114) Corporate managers (121, 122, 123) Managers of small enterprises (131)</td>
</tr>
<tr>
<td>3. <strong>Data workers</strong></td>
<td>Teachers except post-secondary (155-159) Counsellors, educational and vocational (163) Librarians, archivists and curators (164-165) Administrative support occupations, including clerical (303-319), except Computer equipment operators (308-309)</td>
<td>Teaching professionals (232, 233, 234, 235) Other professionals (243) Teaching associate professionals (331, 332, 333, 334) Other associate professionals (343,344) Office clerks (411, 412, 413, 414, 419) Customer service clerks (421, 422)</td>
</tr>
<tr>
<td>4. <strong>Service workers</strong></td>
<td>Sales occupations (243-285) Service occupations (403-469) Social recreation and religious workers (174-177) Writers and artists (183-189)</td>
<td>Other professionals (245, 246) Other associate professionals (345, 346, 347,348) Personal and protective services workers (511, 512, 513, 514, 515, 516) Models, salespersons and demonstrators (521, 522) Sales and services elementary occupations (913, 913, 913, 914, 915, 916)</td>
</tr>
</tbody>
</table>