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Trends in Technology Use

This study aims to investigate the relationship between the use of technology, working conditions and the health and well-being of workers in Europe. As it is known that characteristics of work organisation may reinforce or impair both positive and negative effects of technology use, the role of these characteristics is also considered in this study. The research will provide an insight into the trends and changes in technology use and working conditions in European countries. It also aims to outline the processes that are currently taking shape, as well as to identify the opportunities and threats within the emerging trends.

Keywords: *trend, technology, computer, machine*

1. Technology use in different countries

Figures 1 and 2 outline possible shifts in technology use across the different European countries between 1995 and 2005. The figures illustrate whether technology use increased or decreased in the country groups under examination, as well as the direction of the change in machine or computer use. When looking at the trends in technology use within each of the EU 15 country groups, computer use has increased in all of these clusters over the years 2000–2005. The greatest increase in computer use is noted in the Netherlands and the Scandinavian countries, as well as in the continental European countries – that is, Austria, Belgium, France, Germany and Luxembourg. In all of these country groups, a simultaneous sharp decrease in technology-free situations has been observed. The southern European countries – namely, Greece, Italy, Portugal and Spain – and Ireland and the UK show the same trend, although the observed changes are somewhat smaller. However, only in Ireland and the UK is the combination of computer and machine use decreasing.

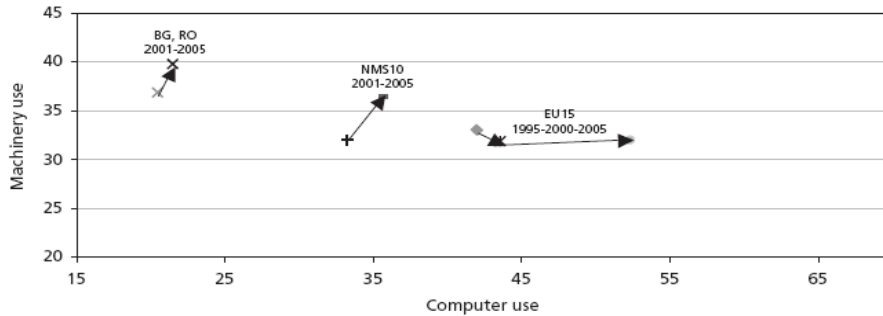


Figure 1 Trends in the use of technology, by EU membership status, 1995–2005

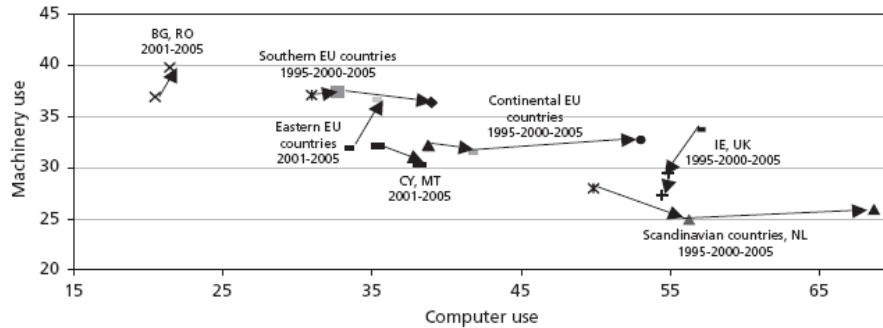


Figure 2 Trends in the use of technology, by country group, EU27, 1995–2005 (%)

2. Technology use in different sectors

Figure 3 shows the changes in technology use in different sectors of the economy over the period 2000–2005. In several sectors, both machine use and computer use have been increasing in the following sectors: electricity, gas and water supply; wholesale and retail trade; public administration and defence; and other, non-commercial services. When condensing the sector variable into the four categories of technologies used at work, changes in technology use within these categories can be sketched out. Between 2000 and 2005, the agriculture and fishing sector records a decrease in technology-free situations at work and an increase in machine use. The greatest increase in the use of computers at work took place in the services and ‘other services’ (community, social and personal activities) sectors.

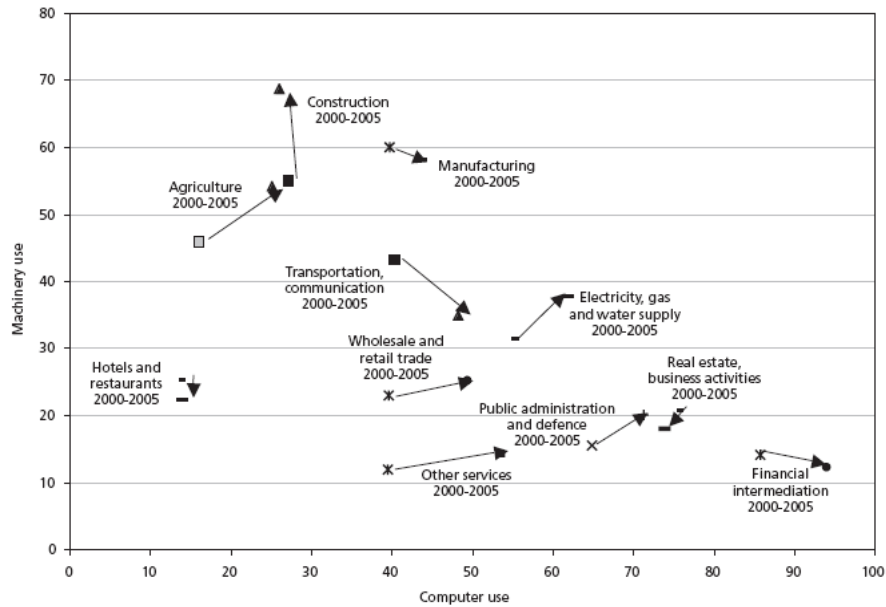


Figure 3. Trends in the use of technology, by sector and type of technology, EU15, 2000–2005 (%)

3.Skills use

Two methods of looking at trends in skills use are explored in this research: the first relates to the proportion of monotonous and repetitive work, and the second looks at skills use at the different occupational levels as defined by ISCO. Figure 4 outlines the trends in skilled work – that is, nonmonotonous and non-repetitive work – and unskilled work – that is, monotonous, short repetitive work – in the various country groups over the period 2000–2005 for the EU15 and 2001–2005 for the NMS. To make the comparisons clearer, the two mixed categories – those reporting monotonous work but non-repetitive tasks and those reporting non-monotonous work but repetitive tasks – are not included for consideration. Southern European countries appear to have the highest share of monotonous, short repetitive work (unskilled work) and a relatively low proportion of nonmonotonous, non-repetitive work (skilled work). The trend line shows a further increase in unskilled work and a further decrease in skilled work in the southern European countries since 2000. Bulgaria and Romania, as well as Cyprus and Malta, face the same trend – notably, an increase in unskilled work and a decrease in skilled work – although these countries record a higher share of skilled work than the southern European countries.

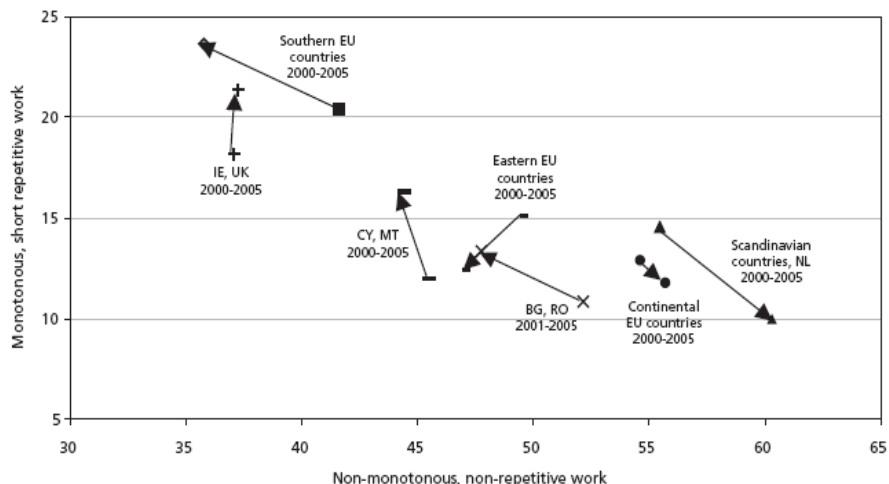


Figure 4 Trends in skilled and unskilled work, by country group, EU27, 2000–2005 (%)

In Ireland and the UK, a relatively low amount of skilled work is found and an increase in unskilled work is observed between 2000 and 2005. At the other end of the spectrum, the Scandinavian countries and the Netherlands experience a relatively high and increasing proportion of skilled work, while also showing a relatively low and decreasing share of unskilled work. The eastern European countries show both a decrease in skilled and unskilled work. This result, at first sight contradictory, is attributable to the rise in the proportion of the mixed categories (non-repetitive/monotonous and repetitive/non-monotonous) in these countries over the period 2001–2005. The continental European countries record a minor increase in skilled work and a small decrease in unskilled work.

Between 1995 and 2005, the southern European countries experienced a decrease in white-collar jobs, in the case of both high and low-skilled work. On the other hand, the share of low-skilled blue-collar work has increased in southern Europe. Eastern European countries also faced an increase in low-skilled blue-collar work, while experiencing a decrease in high-skilled white-collar work. The same holds true for Bulgaria and Romania, which recorded a decrease in high-skilled white-collar work and an increase in low-skilled blue-collar work. Nonetheless, for the Scandinavian countries and the Netherlands, the situation appears to be relatively stable. The continental European countries also experienced a noticeable increase in high-skilled white-collar work.

4.Task autonomy and its relationship with technology use

Trends in task autonomy at work in the individual country groups between 1995 and 2005 are presented in Figure 5. It is striking that, in all of the country groups, a decrease in high task autonomy jobs is observed. In order to explore whether this is related to the type of technology used at work, trends in task autonomy are also analysed in this regard (Figure 6). However, the findings do not clearly indicate that the decrease in task autonomy is related to the type of technology used: a decrease in task autonomy is observed in three of the four categories of technology used in European worksites – the exception is in the category of machine use, which shows a low but stable task autonomy. In general, computer users are more likely to experience higher work task autonomy.

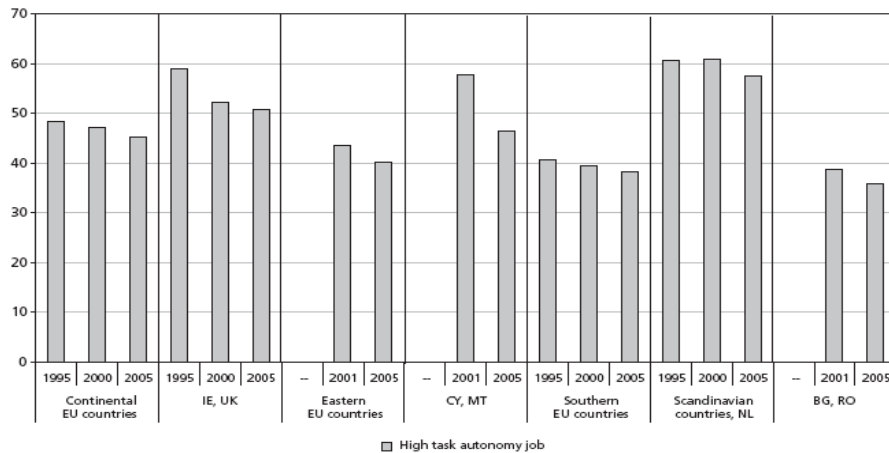


Figure 5 Trends in high task autonomy jobs, by country group, EU27, 1995–2005 (%)

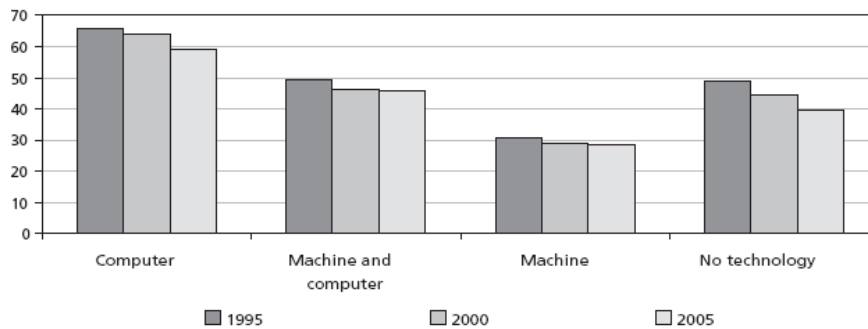


Figure 6 Trends in high task autonomy jobs, by use of technology, EU15, 1995–2005 (%)

Conclusions

This study aimed to investigate the relationship between technology use at the workplace and working conditions, as well as the effect of technology on workers' health and well-being. The study's findings reveal that significant differences exist between computer users, machine users and nonusers of technology.

In general, computer use is more prevalent among higher educated workers. This finding is in line with earlier research findings (Steijn, 2001). In terms of economic sectors, the highest proportion of people working with computers can be found in the financial intermediation, real estate, and public administration and defence sectors. Across all age groups, women report greater use of computers at work than men. This gender difference in terms of working with computers is not related to differences in education or to the distribution of men and women across the sectors of activity. Women's greater use of computers at work can rather be explained by the fact that men and women have different occupations and/or work at different occupational levels. When looking at the various EU countries individually, Sweden appears to rank in first place in terms of computer use at the workplace, followed by the Netherlands, while Bulgaria and Romania are lagging behind, with relatively small proportions of workers using computers at work. A possible explanation for the higher uptake of computer use in the Netherlands and the Scandinavian countries is that these countries also score highest in relation to related (or maybe required) changes in work organisational practices (as referred to in the Commission's Microeconomic Guideline No. 13 and Employment Guideline No. 20 – see pp. 6-7). Other explanations may relate to the countries' labour market or economic situation.

Machine use is most common in sectors such as manufacturing, mining and construction, and among workers with low educational qualifications. The use of machines at work is particularly widespread in eastern and southern European countries, as well as in Bulgaria and Romania which joined the EU in 2007. Technology-free working environments are quite often found in Bulgaria.

The Netherlands and Scandinavian countries show the highest share of workers using e-mail and the Internet, followed by the continental European countries. Bulgaria and Romania have the lowest proportion in this regard.

Trends in technology use in the EU27 between 1995 and 2005 show an increase in computer use and a decrease in technology-free working environments and machine use. This trend is found for men and women in all age groups, but not for all countries within the EU27. When different country groups are considered, a shift towards more computer work is observed in all of these country groups. However, in Ireland and the UK, the use of computers at work increased, while the combined use of computers and machines decreased from 2000 to 2005. Eastern European countries, such as Bulgaria and Romania, as well as Cyprus and Malta, recorded small increases in the use of computers at work. In general, the eastern European countries, as well as the latest accession countries Bulgaria and

Romania, are at earlier stages of technological development than the continental European countries, the Netherlands and the Scandinavian countries. Eastern European countries and Bulgaria and Romania are the only country clusters in which an increase in machine use is observed. This finding may be related to the sectoral distribution of the labour force in these countries. Eastern European countries have relatively large agriculture and fishing, and manufacturing sectors, in which machine use is common.

Trends related to the skills that are used in jobs show that the proportion of monotonous, short repetitive work – that is, ‘unskilled’ work – is highest and continues to increase in the southern European countries, while the share of non-monotonous, non-repetitive work – that is, ‘skilled’ work – remains low and is decreasing in these countries. The Netherlands and Scandinavian countries, on the other hand, have a relatively high and increasing proportion of ‘skilled’ work, while the share of ‘unskilled’ work is relatively low and decreasing. In terms of type of occupation in the EU15, an increase in low-skilled blue-collar and high-skilled white-collar work has been observed between 2000 and 2005.

The southern European countries experienced a decrease in both high and low-skilled white-collar work, while the share of low-skilled blue-collar work has increased. Eastern European countries also recorded an increase in low-skilled blue-collar work and experienced a decrease in high-skilled white-collar work. The same trend has been observed in Bulgaria and Romania, which recorded a decrease in high-skilled white-collar work and an increase in low-skilled blue-collar work.

When looking at the overall trend in the EU15 between 1995 and 2005, it appears that computer users, workers who use both machinery and computers, as well as workers who do not use any technology at the workplace, have been facing a decrease in the level of autonomy at work, particularly in their capacity to change tasks. This decline in task autonomy in computerised work situations might be related to the introduction of new software systems. Over this period, there has been a broad uptake of workflow software, ERP or other company-wide software systems, including built-in mandatory fields and automated planning systems. Compared with machine users, computer users are more likely to have higher task autonomy. For machine users, a stable but low task autonomy is reported.

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