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DIRECTORATE FOR SCIENCE, TECHNOLOGY AND INDUSTRY
COMMITTEE FOR INFORMATION, COMPUTER AND COMMUNICATIONS POLICY

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Working Party on the Information Economy

THE IMPACT OF THE ECONOMIC CRISIS ON ICT AND ICT-RELATED EMPLOYMENT

Paris, 17-18 June 2009

This paper is a contribution to analysis and discussion of the relations between ICTs, the economic crisis and recovery, requested at the December 2008 meeting of the ICCP Committee.

Note that the most recent data on employment and employment trends report developments through to March-April 2009, but that even these data have not yet captured the breadth and depth of the impacts of the crisis on employment. The paper should be read in conjunction with DSTI/ICCP/IE(2009)1/REV1, which looks more broadly at growth, R&D, financing, etc. The analysis of short-term firm-level data has been undertaken by Christian Reimsbach Kounatze, consultant.

Delegates are invited to: i) discuss the paper; ii) suggest how this work can be carried forward and provide sources of employment data where possible; and iii) agree that elements of this work be included in the IT Outlook 2010.

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Summary

1. This document provides information of indicators that can be used in WPIE analysis of ICT employment trends. Preliminary analysis of short-term cyclical data show that employment is dropping in the ICT sector – notably in ICT goods sectors, and remaining flat in ICT services. There is considerable variation across countries, with official data showing ICT goods employment holding up well in Japan and Korea despite plunging output in both countries. ICT employment is also performing reasonably well compared with total employment and with sectors such as automobiles and financial services.

2. In terms of the employment performance of 80 global ICT firms analysed for this paper, although they are shedding some employees in Q1 2009, this is not yet of the scale of that seen around 2002, even in semiconductor firms which are seeing very rapid declines in revenues. The only exception is Internet firms which have lost a significant share of employment. In general large firms are retaining employees during this phase of the recession, although worse may be yet to come. One rationale for labour retention is the much better net cash position of ICT firms in this recession compared with the last one.

3. ICT sector employment is also more cyclical than value added, and lags the value added recession cycle; employment reached a peak in 2000-2001 (2000 in manufacturing, 2001 in services), bottomed out in 2003-2004 and only started growing again in 2005, suggesting that ICT employment may be slow to pull out of this recession, even if the structural causes are different from the last one. Finally, looking more broadly across the economy at ICT-related employment, there has been continuing growth of ICT specialists as a share of the total labour force, but a flattening of the share of ICT-intensive users in the total.

Introduction

4. With the deepening of the economic crisis, unemployment has risen rapidly and there is mounting pressure on existing employment. Employment in the ICT industry itself is around 5.5% of total business sector employment. Employment of ICT specialists (software engineers, IT technicians, etc.) across the economy is around 3-4% of total employment and up to 5% in some countries, and over 20% of total employment is taken up by intensive users of ICTs (office workers, professionals, etc.). Thus the share of employment in the ICT sector and in ICT-related areas is significant and the evolution of this employment deserves attention in the current deep recession and recovery. Despite forward-looking indicators showing some signs of flattening out of the recession or even beginnings of an upturn (OECD Composite Leading Indicators, 8th June 2009), unemployment is expected to continue rising for some time. This follows the usual business cycle pattern of unemployment lagging declines in output.

5. The aim of this work is to analyse short-term movements and long-term trends in ICT-related employment and compare these with broader trends in employment and unemployment across the economy. It will also consider what ICT policy or broader employment policy can do to change the employment numbers or skill sets of employees in ICT-related employment.

6. This work will focus on:

- Recent trends in ICT and ICT-related employment;
- Comparisons with aggregate employment and unemployment;

- Recent trends and changes in ICT-related policies and broader economic policies that can affect ICT-related employment and skill sets. Note that this work would be undertaken in conjunction with preparation of the *Information Technology Outlook 2010*.

7. There are also likely to be potential impacts on ICT employment coming from government strategies to deal with the economic crisis. Governments in OECD countries are introducing economic stimulus packages to address the economic crisis. These packages aim to stimulate demand in the short-term, by improving the flow of money and restoring the health of the banking sector, protecting existing jobs and creating new ones. Most governments also plan to foster growth through supply-side investments and demand-side measures to help restore favourable conditions for innovation and long term growth. In many cases these plans are directly relevant to the ICT sector and technology diffusion. In particular their focus on job creation coupled with a bias towards new technologies and ICT-intensive "smart" investments and ICT-intensive "green growth" suggests considerable impacts on ICT-related employment.

8. The next sections look at employment indicators used in the IT Outlook in the past, and supplement these with new data and analysis on firm-level data from the top ICT firms. These indicators are used to analyse recent trends in ICT and ICT-related employment, and to compare these trends with other sectors and with aggregate employment to identify trends during the current turbulent labour market conditions.

9. It is intended that some of the indicators and accompanying analysis presented in this overview are included in a Chapter in the *OECD Information Technology Outlook*, 2010 edition.

Preliminary overview of indicators

Short-term indicators of ICT goods and services employment

10. Some countries regularly publish official national data on employment at disaggregated level, which can be used to analyse short-term cyclical trends in ICT sector employment. These indicators use official monthly or quarterly employment data mainly based on Labour Force Surveys. Due to rapid downward movements in employment these are presented as 3-month moving averages to iron out very short-term monthly fluctuations. These data are presented in the Annex, Figures 1-10 for Canada, Germany, Japan, Korea, the United Kingdom and the United States, and for Chinese Taipei. These data are usually available with a lag of around 3 months behind the current period, so they have not yet captured the full extent of employment performance of the ICT sector during the current very sharp economic recession. Furthermore, because declines in employment usually lag those in production, we can expect employment to continue to decline for around one year after the economy has begun to pick up.

11. Overall the data presented in this preliminary paper in Annex Figures 1-10 show the following developments:

- So far employment data have not yet shown the large declines in employment seen in the last downturn around 2002-2003. The 3 month moving averages show clearly the recent decline to negative growth in *ICT goods* in Canada, Germany, the UK and the US and positive growth in Japan and a sharp rebound in employment in Korea. These last two are surprising considering the very sharp falls in production in both countries. In ICT goods employment, the UK and the US are faring worst in the first quarter of 2009.

- ICT services have tended to be flat or declining a little in terms of year-on-year growth for all countries for which data are available, however the US has declined most (around 4% year-on-year). On the other hand ICT services employment is holding up much better than ICT goods employment;

- In comparison with other sectors, the picture is somewhat mixed, although ICT goods and services are in general retaining employment better than other major sectors and than manufacturing and services totals. In particular, ICT manufacturing employment is performing far better than in automobile manufacture. Furthermore IT services are generally performing better than telecommunications services in terms of year-on-year employment performance. The exceptions to this generally better performance are in Germany where ICT manufacturing is slumping, in Japan where ICT manufacturing is not performing as well as e.g. motor vehicles despite remaining positive, and in the United States where both IT service employment and telecommunications services employment are currently losing employees at a faster rate than total services.

12. Overall these short-term cyclical data show that employment is dropping in the ICT sector – notably in ICT goods sectors, and remaining flat in ICT services. There is considerable variation across countries, with official data showing ICT goods employment holding up well in Japan and Korea despite plunging output in both countries. ICT employment is also performing reasonably well compared with total employment and with sectors such as automobiles and financial services.

Employment in large ICT firms

13. This section describes employment performance for a set of top-250 ICT firms in eight different ICT sectors to compare recent employment trends in more detail. These data are designed to supplement and expand the data available from official sources. The numbers of employees in each sector is pooled to make up the Top-10 firm sector groupings. Employment figures for 2007, 2008, and for the first quarter of 2009 are then compared with 2000, 2001, and 2002 respectively. Although most recent employment data for the first quarter of 2009 cannot be compared on year-on-year basis, those data provide a snapshot of the current employment situation in large ICT firms.[1]

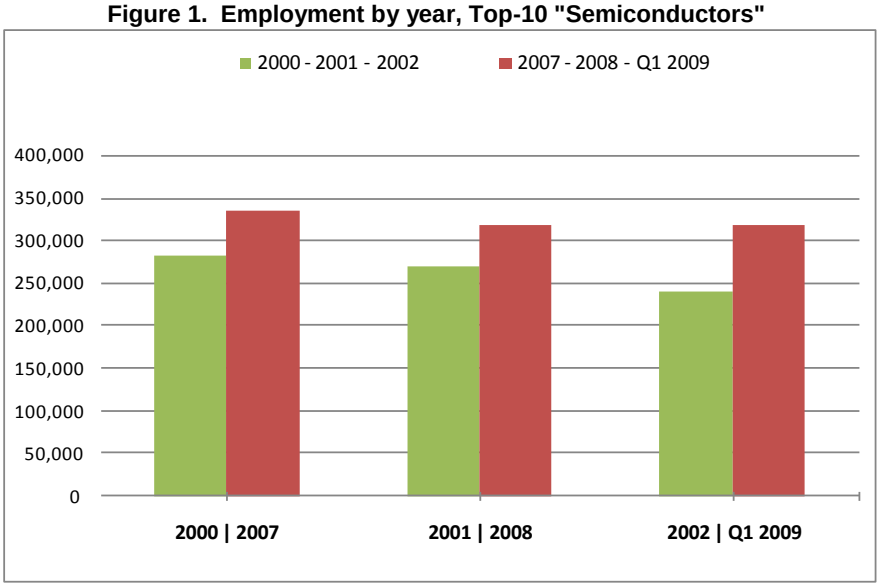
14. The "sectors" summarized below comprise the top-10 ICT firms in each sector, as identified in the *Information Technology Outlook 2008.* Overall the results suggest that there is considerable variation in results across sectors as would be expected in the recession, and geographical and firm-specific factors also account for a large deal of variability.

Semiconductors

15. The semiconductor industry as usual was earliest hit of all ICT sectors by the economic recession. Most recent data show a slight decrease in employment among top-10 semiconductor firms in the beginning of 2009, but not at the amplitude of 2002 where more than 30 000 jobs were cut (-11% of the total workforce) (Figure 1). At the beginning of 2009, top-10 semiconductor firms employed almost 318 000 people. This is only 500 employees less than in 2008 (-0.2% of total workforce) but still almost 18 000 employees less than in 2007 (-5%). ASM International is the only semiconductor firm in the *first quarter of 2009* reporting fewer employees than in 2008 (-5% of its workforce).

[1] For more details on the methodology and approach used refer to paper DSTI/ICCP/IE(2009)1/REV1.

Figure 1. Employment by year, Top-10 "Semiconductors"



Note: Employment data for 2007-Q1 2009 and 2000-2002 are based on firms' annual reports. Where fiscal year did not end in Q1 2009, most recent available data have been used as provided by Yahoo! Finance, based on Capital IQ.

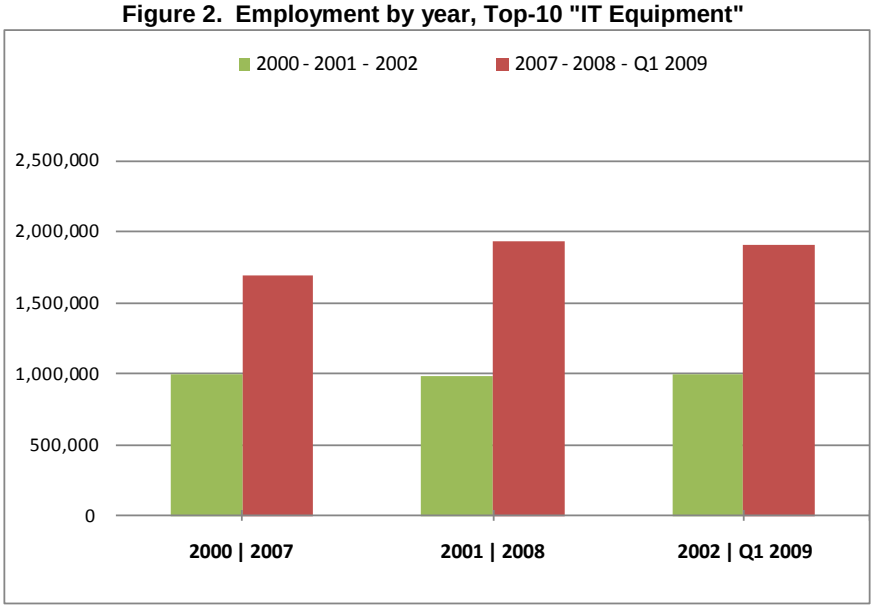
16. The number of job cuts in 2009 could increase, however, as some firms have announced lay-offs during the year (Intel: 6 000, 7% of total workforce; STM: 4 500, 8%; Texas Instruments: 3 600, 12%; Infineon). But these announcements must be treated carefully as many companies are also investing and hiring (but possibly at a lower rate) in new areas to assure future competitiveness.

IT equipment

17. IT equipment firms, especially in Asia, were strongly hit by the current downturn with revenues in the beginning of 2009 falling even more sharply than during the crisis in 2001-2002. Where available, employment data, however, do not reveal strong job cuts among top-10 IT equipment firms yet. In the first quarter of 2009, top-10 firms employed more than 1.9 million people.[2] This is around 28 000 less than people employed in 2008 (-1.5% of total workforce), but still 214 000 employees more than in 2007 (+13%). In the first quarter of 2009, Dell, NEC, and Fujitsu cut each around 9 500 jobs compared to 2008 (-11%, -6% and -6% of their respective workforce).

[2] This does not include more than 100 000 employees of ASUSTek in the beginning of 2009.

Figure 2. Employment by year, Top-10 "IT Equipment"



Note: Employment data for 2007-Q1 2009 and 2000-2002 are based on firms' annual reports. Where fiscal year did not end in Q1 2009, most recent available data have been used as provided by Yahoo! Finance, based on Capital IQ. Figure does not include the number of employees of ASUSTek for all periods and of Quanta for 2002 and earlier. The number of employees of HonHai for 2002 has been estimated using 2001 employement data.

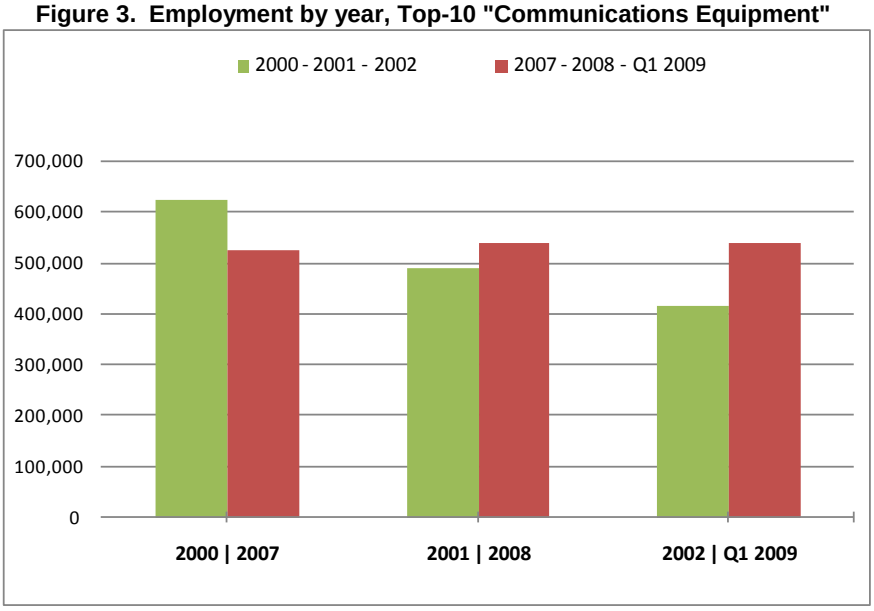
18. This development is to some extent comparable with that experienced in 2000-2002, where employment was almost stable (see Figure 2). However, companies have announced further lay-offs (e.g. Toshiba: 4 500, 2%). Other companies report cutting jobs but have made no public statements on the expected magnitude of cuts (HP, IBM, Hon Hai). At the same time, however, some companies point out that recruitments will continue.

Communications equipment

19. Top-10 communications equipment firms suffered a strong drop of their quarterly revenues since the last quarter of 2008. Most recent employment figures, however, do not show any job cuts among top-10 communications equipment firms yet. Particularly, mass layoffs have not taken place as observed during the the crisis in 2001-2002, where employment by top-10 communications equipment firms droped by 15% in 2002 compared to 2001 and by 33% compared to 2000. In the beginning of 2009, top-10 communications equipment firms employed more than 540 000 people, the same number of employees as in 2008 and 2.5% more than in 2007 (Figure 12).[3]

[3] This does not include the number of people employed by Huawei.

Figure 3. Employment by year, Top-10 "Communications Equipment"



Note: Employment data for 2007-Q1 2009 and 2000-2002 are based on firms' annual reports. Where fiscal year did not end in Q1 2009, most recent available data have been used as provided by Yahoo! Finance, based on Capital IQ. Figure does not include the number of employees of Huawei.

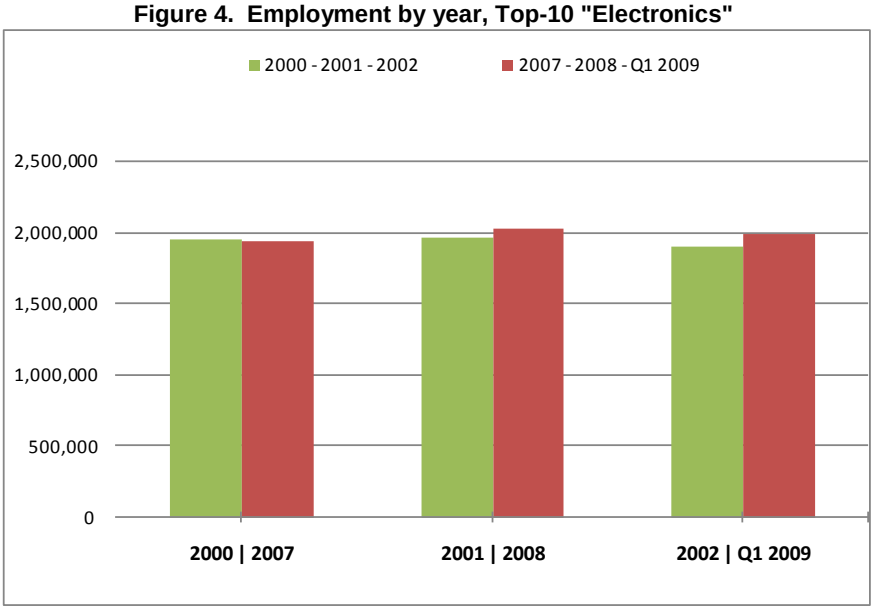
20. As in other ICT sectors, however, many communications equipment companies have announced job cuts for 2009 (Motorola: 4 000, 6% of total workforce; Ericsson: 5 000, 6%; Nokia; Nortel). At the same time, growing demand for some communications and Internet infrastructures leads companies such as Qualcomm to announce at least 2 600 engineering recruitments during 2009.

Electronics

21. The electronic sector was hit by declining global sales with quarterly revenues started to fall in the last quarter of 2008. The impact of the current crisis on employment in top-10 electronics firms has been relative small compared to the crisis in 2001-2002, where in 2002 more than 65 000 job were cut (3% of the total workforce). In the first quarter of 2009, top-10 firms employed almost 2 million people, which is over 40 000 people less than the total number of employees in 2008 (-2% of total workforce), however, it is still 43 000 employees more than in 2007 (+2%) (Figure 4).

22. Hitachi and Panasonic have both reported a significant reduced number of employees in the first quarter of 2009 compared to 2008: Hitachi has reduced the number of employees by 31 000 (-8% of its workforce) and Panasonic by 14 000 (-5%). Additionally, companies have announced job cuts for 2009 (e.g. Sony: 8 000, 4.5%). Again those announced numbers have to be taken with care, as they do not include recruitments in progress.

Figure 4. Employment by year, Top-10 "Electronics"

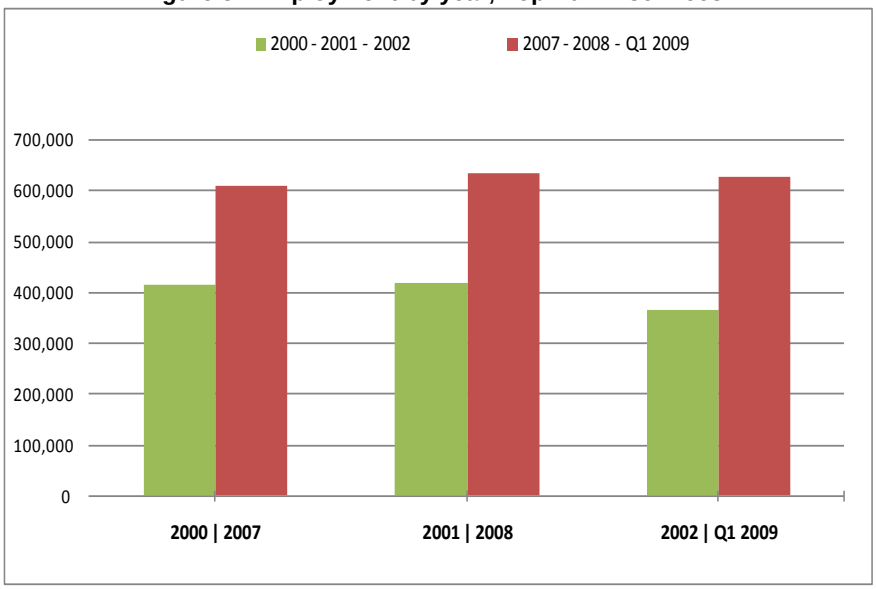


Note: Employment data for 2007-Q1 2009 and 2000-2002 are based on firms' annual reports. Where fiscal year did not end in Q1 2009, most recent available data have been used as provided by Yahoo! Finance, based on Capital IQ. The number of employees of LG and Samsung for 2008 and of Samsung for 2001 have been estimated using employement data for 2007 and 2000 respectively. The number of employees of Panasonic in 2000 have been estimated by using 2001 employement data.

IT services

23. Few top IT services firms have so far drastically reduced the number of employees. In the beginning of 2009, top-10 IT services firm employed more than 630 000 people, which is 7 000 employees less than in 2008 (-1% of total workforce) (Figure 5). Accenture and Unisys both, for instance, have reduced the number of their employees by 5 000 (3% of their workforce) and 2 000 (7%) respectively. Meanwhile, some IT services firms such SAIC continued hiring in the first quarter of 2009 (1 600 employees, +4% of their workforce).

Figure 5. Employment by year, Top-10 "IT services"



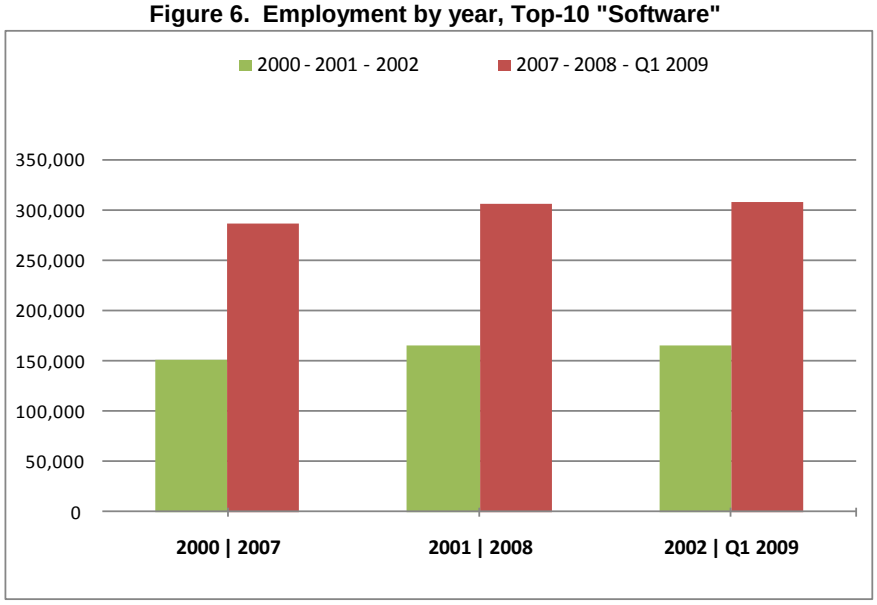
Note: Employment data for 2007-Q1 2009 and 2000-2002 are based on firms' annual reports. Where fiscal year did not end in Q1 2009, most recent available data have been used as provided by Yahoo! Finance, based on Capital IQ.

24. While not laying off employees, IT services firms such as Cap Gemini announced slower hiring for 2009. This trend also extends to leading Indian IT services firms (e.g. TCS, Infosys, HCL, Cognizant), where hiring dropped by 22% in the first quarter of 2008 and by almost half in the second quarter (compared to the same period one year earlier). These hiring drops are also reflected in the decreasing number of new outsourcing centres opened by IT services firms (Everest Research, 2009). However there is evidence that there is much lower job-churning in Indian services firms than in the recent past and lower recruitment rates do not automatically translate into job losses. There have also be reports that Indian service firms have been increasing their activity as firms in OECD countries continue to aim to achieve cost savings by outsourcing their IT / BPO activities.

Software

25. Slowing investment in long-term and high-valued software projects during the current crisis has increased the pressure for layoff in software companies or at least has slowed hiring. Until now only one firm (SAP) has reported to have employed less people in the first quarter of 2009 compared to 2008 (more than 1 500, -3% of its workforce). Overall, the number of employees in top-10 software firms increased in the beginning of 2009 by more than 1 000 people compared to 2008 (+0.3% of total workforce) and by more than 21 000 people compared to 2007 (+7%), with companies such Oracle and Adobe having increased the number of their employees in the first quarter of 2009 compared to 2008 (Figure 6).

Figure 6. Employment by year, Top-10 "Software"



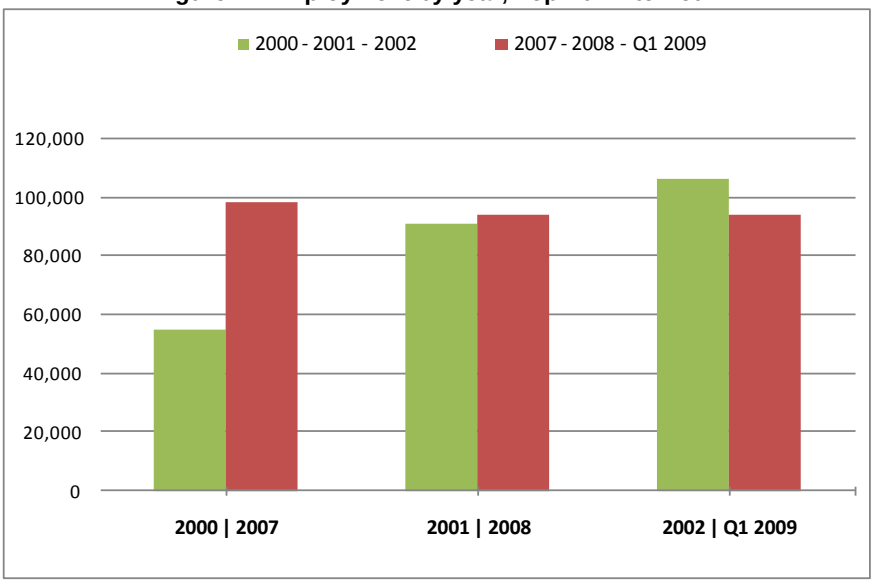
Note: Employment data for 2007-Q1 2009 and 2000-2002 are based on firms' annual reports. Where fiscal year did not end in Q1 2009, most recent available data have been used as provided by Yahoo! Finance, based on Capital IQ.

26. Although few top-10 software companies have reported falling employment numbers for the first quarter of 2009, many job cuts for the near future have been announced – until now more than 10 000 jobs (over 3% of total workforce). Microsoft, for instance, announced cuts of 5 000 jobs for 2009 and 2010 (more than 5% of its employees).

Internet

27. Where available, employment data do not reveal job cuts among top-10 Internet firms yet. In the beginning of 2009, top-10 Internet firms employed more than 94 000 people, the same number of employees as in 2008 but almost 4% less than in 2007 (Figure 7).[4]

Figure 7. Employment by year, Top-10 "Internet"



Note: Employment data for 2007-Q1 2009 and 2000-2002 are based on firms' annual reports. Where fiscal year did not end in Q1 2009, most recent available data have been used as provided by Yahoo! Finance, based on Capital IQ. Figure does not include the number of employees of AOL LLC for 2007 to Q1 2009 and of Expedia for 2000 to 2002.

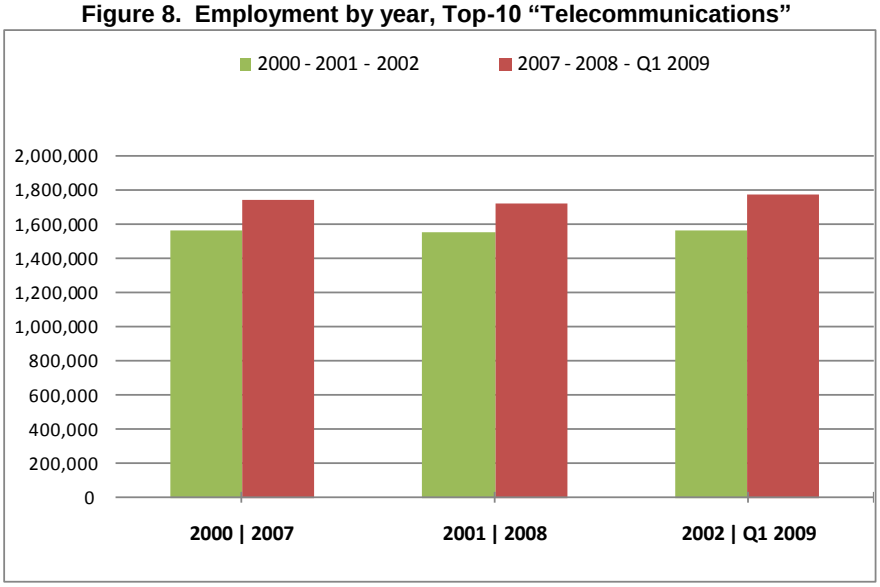
28. However, more than 3 500 job cuts have been announced by top-10 Internet firms (i.e. over 2% of the total workforce). Yahoo!, for instance, announced that it would cut around 1 500 jobs (over 8% of its employees), eBay announced 1 000 job cuts (over 6%).

Telecommunications

29. Where data for the first quarter of 2009 were available, an increase in employment can be observed. Deutsche Telekom, Verizon Communications, and Nippon Telegraph increased the number of their employees in the first quarter of 2009 compare to 2008 (Deutsche Telekom: + 33 051, +15%; Verizon Communications: + 13 355, +6%; and Nippon Telegraph: + 2 450, +1%). Overall, the number of people employed by top-10 telecommunications firms increased by almost 49 000 in the first quarter of 2009 (+3% of total workforce) (Figure 8).

[4] This does not include the number of people employed by AOL LLC in 2007 to Q1 2009.

Figure 8. Employment by year, Top-10 "Telecommunications"



Note: Employment data for 2007-Q1 2009 and 2000-2002 are based on firms' annual reports. Where fiscal year did not end in Q1 2009, most recent available data have been used as provided by Yahoo! Finance, based on Capital IQ.

30. Meanwhile, other telecommunications have announced job cuts for 2009 and 2010. Telecom Italia, for instance, has announced cuts of up to 5 000 to 9 000 jobs by 2010 (6-12% of its workforce). British Telecom, as another example, has announced cuts up to 15 000 jobs by 2010 (10% of its workforce).

31. Overall it is clear that although major ICT firms are shedding some employees in Q1 2009 this is not yet of the scale of that seen around 2002, even in semiconductor firms which are seeing very rapid declines in revenues. The only exception is Internet firms which have lost a significant share of employment. In general large firms are retaining employees during this phase of the recession, although worse may be yet to come. One rationale for labour retention is the much better net cash position of ICT firms in this recession compared with the last one. This has also had positive impacts on R&D [see DSTI/ICCP/IE(2009)1/REV1].

Longer-term trends: The ICT sector and ICT-related employment

The ICT sector

32. Long-term structural indicators of ICT sector value added and employment are compiled annually, based on data from the OECD Structural Analysis Data Base (STAN), official statistics and partial estimations (see Figure 9). These data are national accounts-compatible. Timeliness is constrained by the relatively long delay in preparing detailed national accounts. Overall these data provide an in-depth view of longer-term trends and developments. However they do not help preparing recent or outlook indicators, and they probably cannot easily be prepared with a shorter time lag, i.e. less than 2 years. These data are calculated as shares of total employment, so in the current recession they may increase their share and perform better than total employment even if declining in absolute terms.

33. Overall, measured as shares of business value added and employment respectively, these indicators show the continuing long-term relative growth in ICT sector value added and flattening off of ICT sector employment, particularly following the last ICT-related recession and fall in employment from 2001-2002 onwards. See Figure 9 for employment data. A more detailed analysis is presented in the *OECD Information Technology Outlook 2008*, Chapter 1.

34. Overall trends in these long-term data include:

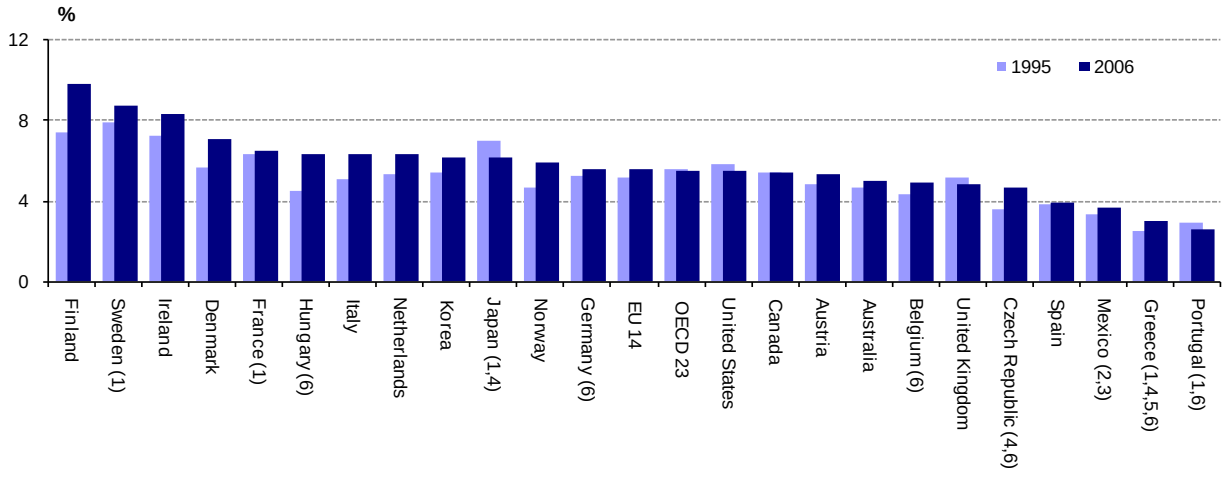
- ICT sector employment makes up 5.5% of total business sector employment in OECD countries, or around 15 million people. Long-term growth (1995-2006) has been around the same as for total business employment, so despite adding 1.4 million employees the share has remained static. As the value added share increased, this is an indication that the sector is becoming less employment-intensive.

- Finland, Sweden and Ireland had the largest shares of employment in total business employment, over 8%, and these shares have increased markedly, as they also did in Hungary, the Czech Republic and Denmark. The share of employment in ICTs declined in some countries, an indication of the impact of increasing manufacturing and services trade with non-OECD economies; all had relative declines or very low growth in both manufacturing and services.

- Over 10 million people are employed in ICT services compared with 5 million in manufacturing. Employment in computer and related services and IT services has grown more rapidly than business services as a whole (including IT services). However, increases in ICT services employment did not counteract declines in ICT manufacturing employment, so that the ICT sector did not increase its share of total business sector employment.

- ICT employment is also more cyclical than value added, and lags the value added recession cycle; employment reached a peak in 2000-2001 (2000 in manufacturing, 2001 in services), bottomed out in 2003-2004 and only started growing again in 2005, suggesting that ICT employment may be slow to pull out of this recession, even if the structural causes are different from the last one.

Figure 9. Share of ICT employment in business sector employment, 1995 and 2006



1. 2005 instead of 2006
2. 2003 instead of 2006.
3. Based on employees figures
4. ICT wholesale (5150) is not available.
5. Telecommunication services (642) included Postal services.
6. Rental of ICT goods (7123) is not available.

Source: OECD estimates, based on national sources; STAN and National Accounts databases, April 2008.

ICT employment across the economy

35. ICT-related employment is spread widely across the economy. Many ICT employees are elsewhere in the economy carrying out ICT tasks and some employees in the ICT sector are non-ICT. Two measures of ICT employment have been developed based on ICT occupations and ICT-related occupations. One is a narrow measure of ICT occupations, comprising ICT specialists whose job is ICTs, e.g. software engineers. The other is a broader measure of ICT employment where ICTs are used regularly as part of the job, but where the job is not focused on ICTs, e.g. a researcher or an office worker (see *OECD Information Technology Outlook 2008*, Chapter 1).

36. The underlying data for these measures are taken either from quarterly labour force surveys or annual labour force surveys and have a lag of around 6 months. This could be reduced somewhat for some countries, but for the total sample of countries for which appropriate data are available, they cannot be provided much more rapidly. These data are calculated as shares of total employment, so in the current recession they may increase their share and perform better than total employment even if declining in absolute terms.

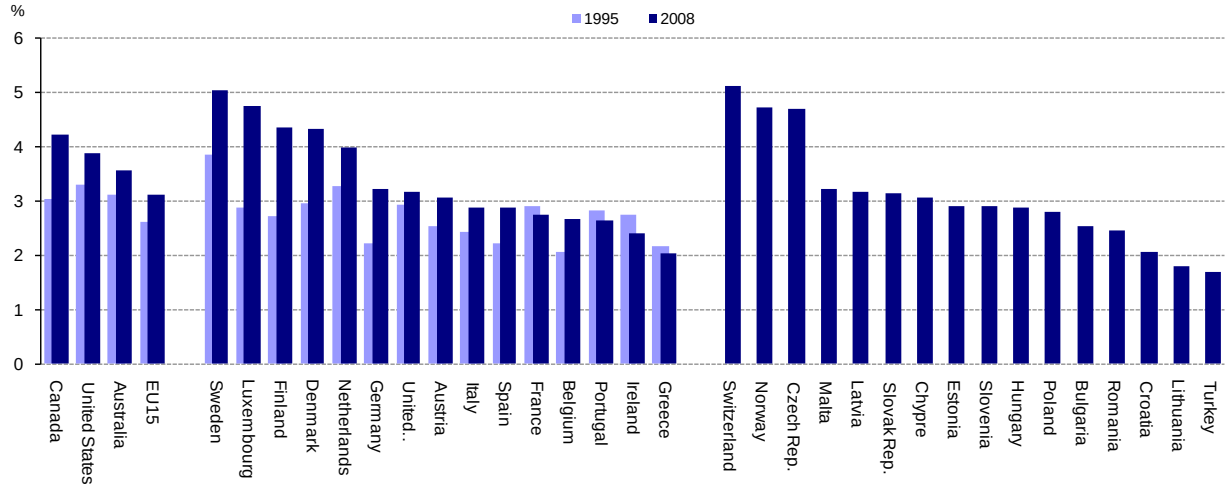
37. The results of this analysis are shown in Figure 10, and are summarised below:

- Around 3-4% of total employment in most OECD countries was accounted for by ICT specialists in 2008 (Figure 10a). This share has risen consistently in recent years in most countries, despite the relative stagnation in the share of ICT sector employment in business sector employment (see preceding section). The divergences between the two suggest that there is ongoing occupational specialisation as higher level ICT skills are required. These skills are used partly in the ICT sector as it restructures around more advanced products and activities, and in larger measure across the wider non-ICT economy as ICT specialist skills are needed to produce ICT products in non-ICT sectors (software in the other sectors for example) and non-ICT products with ICTs embedded in them (automobile systems for example).

- ICT-using occupations (including specialists) make up over 20% of total employment in most countries (Figure 10b). These occupations include e.g. scientists and engineers, as well as office workers, but exclude teachers and medical specialists for whom the use of ICTs is in general not essential for their tasks. Overall, these estimates show the importance of ICT-related occupations across the economy and the necessity of analysing ICT-related activities and employment very broadly.

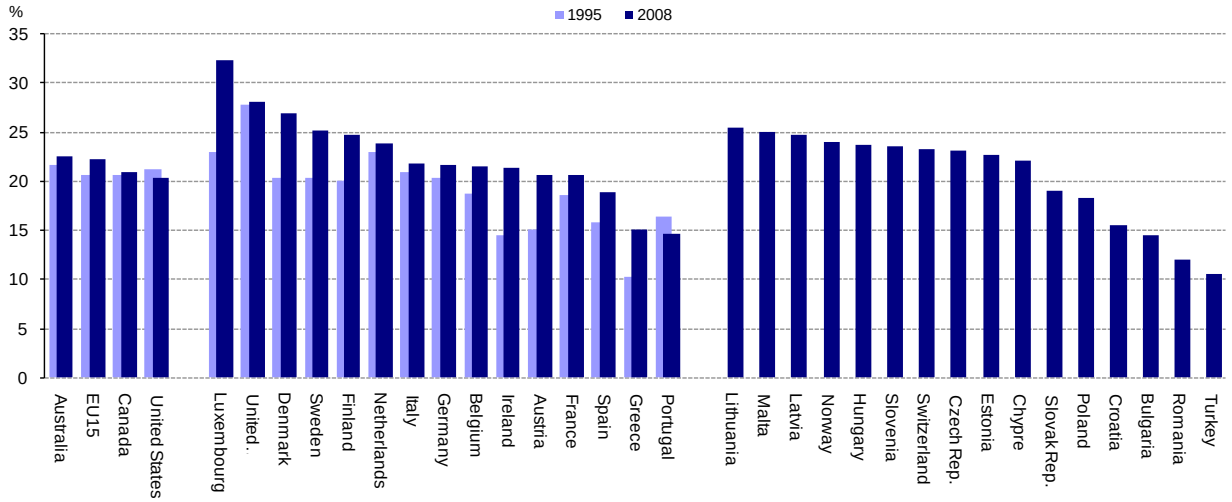
- Overall these indicators show the continuing growth of ICT specialists as a share of the total labour force, but a flattening of the share of ICT-intensive users.

Figure 10a. Share of ICT-related occupations in the total economy, specialist users [(1)], 1995 [(2)] and 2008



1. Narrow definition based on methodology described in OECD (2004, IT Outlook, Chapter 6). The shares for non-European countries are not directly comparable with shares for European countries as the classifications were not harmonized. The EU15 aggregate has been estimated for missing years.
2. Except: Australia, Finland and Sweden 1997 instead of 1995.
Source. OECD calculations from EULFS, US Current Population Survey, Statistics Canada, Australian Bureau of Statistics.

Figure 10b. Share of ICT-related occupations in the total economy, intensive users [(1)], 1995 [(2)] and 2008



1. Broad definition based on methodology described in OECD (2004, IT Outlook, Chapter 6). The shares for non-European countries are not directly comparable with shares for European countries as the classifications are not harmonized. The EU15 aggregate has been estimated for missing years.
2. Except: Australia, Finland and Sweden 1997 instead of 1995.
Source: OECD calculations from EULFS, US Current Population Survey, Statistics Canada, Australian Bureau of Statistics.

Questions for discussion

38. It is proposed that the indicators and analysis being developed in this paper be further developed and contribute to the Information Technology Outlook 2010. Questions for discussion include:

- Does this work address the most important issues in the area of ICT-related employment? What areas of long-term trends are of most interest?

- Are there other areas of high importance that could be undertaken (e.g. unemployment of ICT-related occupations)?

- Are there other data sets or national data that could be used in the analysis?

- What are the most useful sectors for comparison with the ICT sector? Useful comparisons with ICT-related employment across the economy?

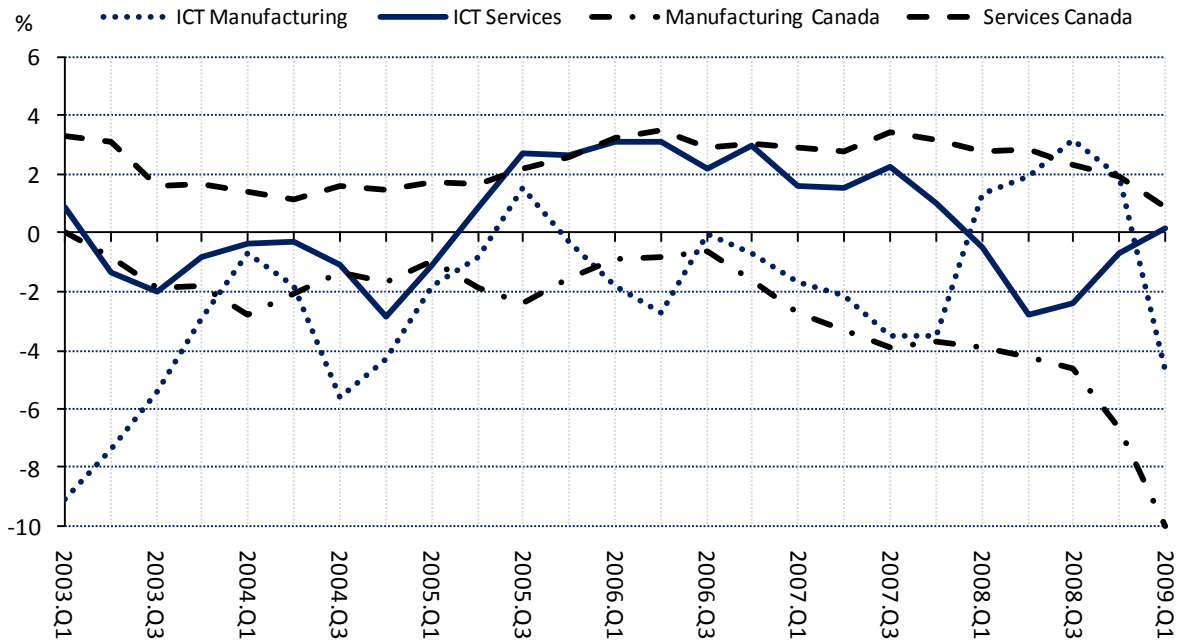
- It is proposed to examine recent trends and changes in ICT-related policies and broader economic policies that can affect ICT-related employment and skill sets. What areas would be of most use?

ANNEX FIGURES

CANADA

Figure 1. Growth in employment, Q1 2003 – Q1 2009

Year-on-year percentage change

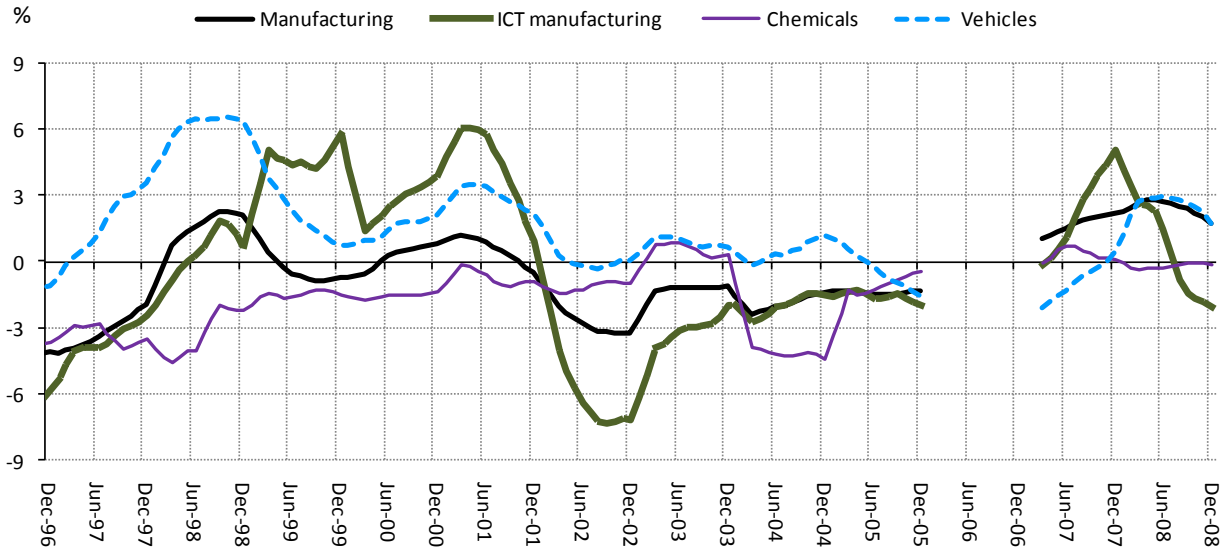


Source: Industry Canada, Quarterly Monitor of the Canadian ICT Sector, First Quarter 2009, June 2009.

GERMANY

Figure 2. Growth in employment in selected manufacturing sectors, December 1996 – December 2008

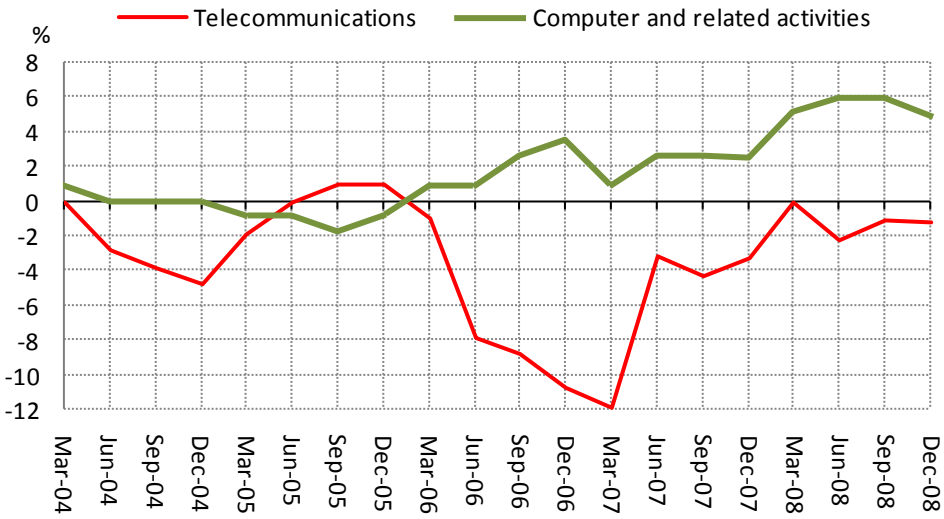
Year-on-year percentage change, employed persons, 3-month moving average



Note: Break in series in 2006. Enterprises with less than 50 employees were not included in the sample.

Figure 3. Growth in quarterly employment in ICT services, March 2004 – December 2008

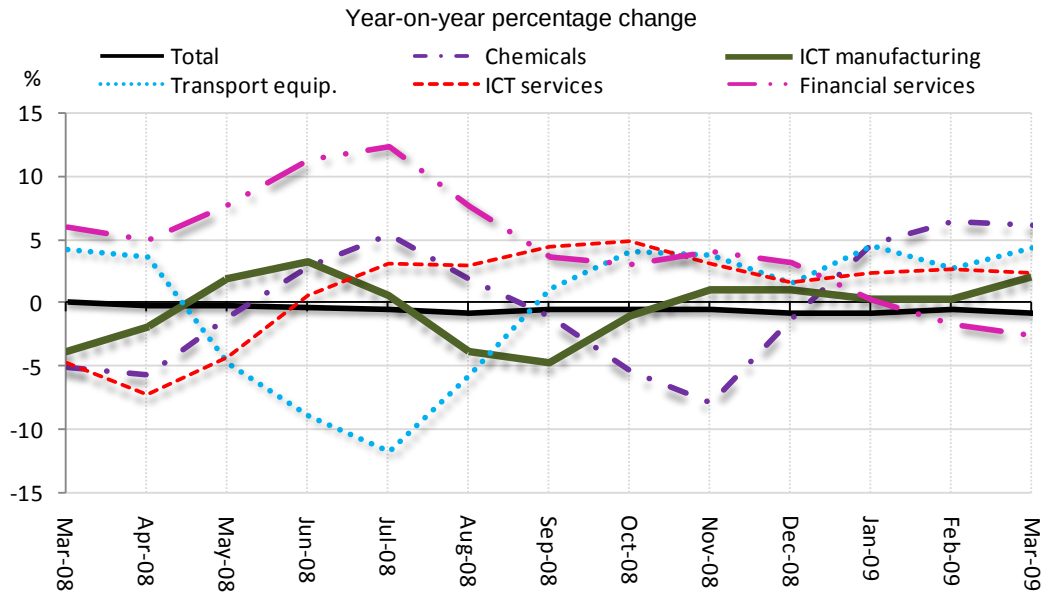
Year-on-year percentage change, indices, seasonally adjusted



Source: Destatis, Federal Statistics Office, May 2009.

JAPAN

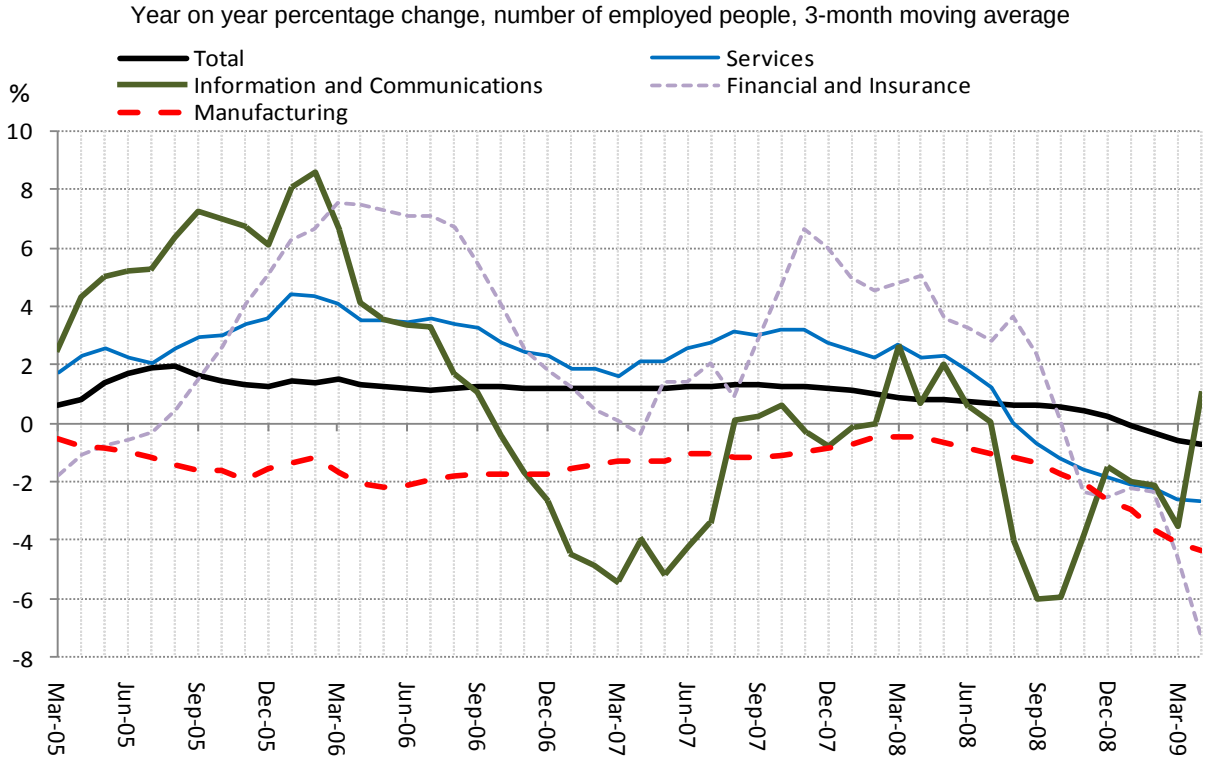
Figure 4. Growth in monthly employment in selected goods and services, March 2008 – March 2009



Source: Labour Force Survey, May 2009.

KOREA

Figure 5. Growth in monthly employment in selected goods and services, March 2005 – April 2009

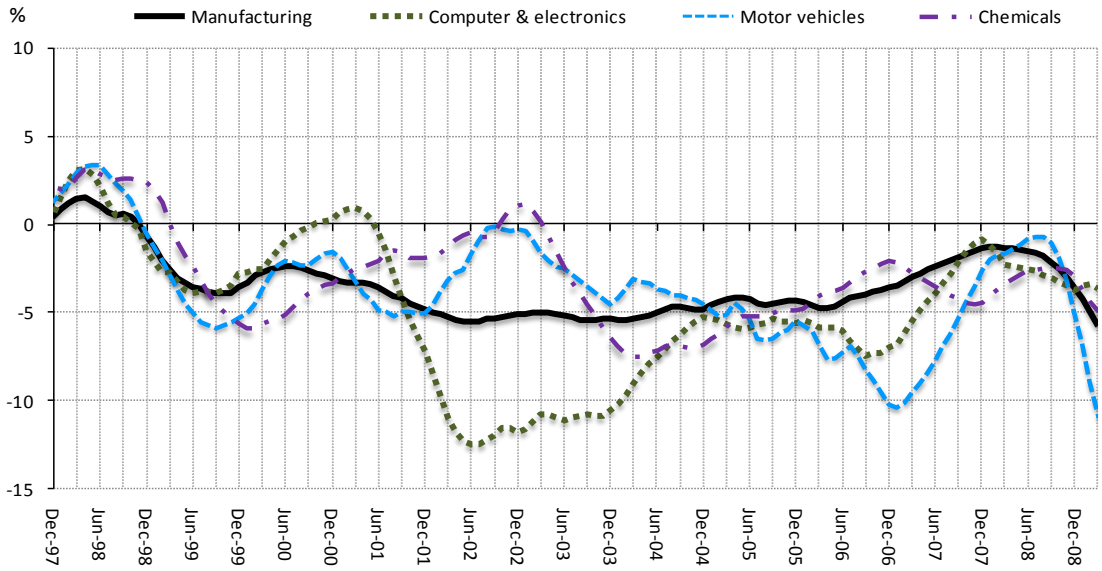


Note: Total Services is composed by "Electricity, transport, telecom. & finance" services
Source: Korea National Statistics Office, May 2009.

UNITED KINGDOM

Figure 6. Growth in monthly employment in selected manufacturing sectors, December 1997 – March 2009

Year-on year percentage change, number of employee jobs, 3-month moving average

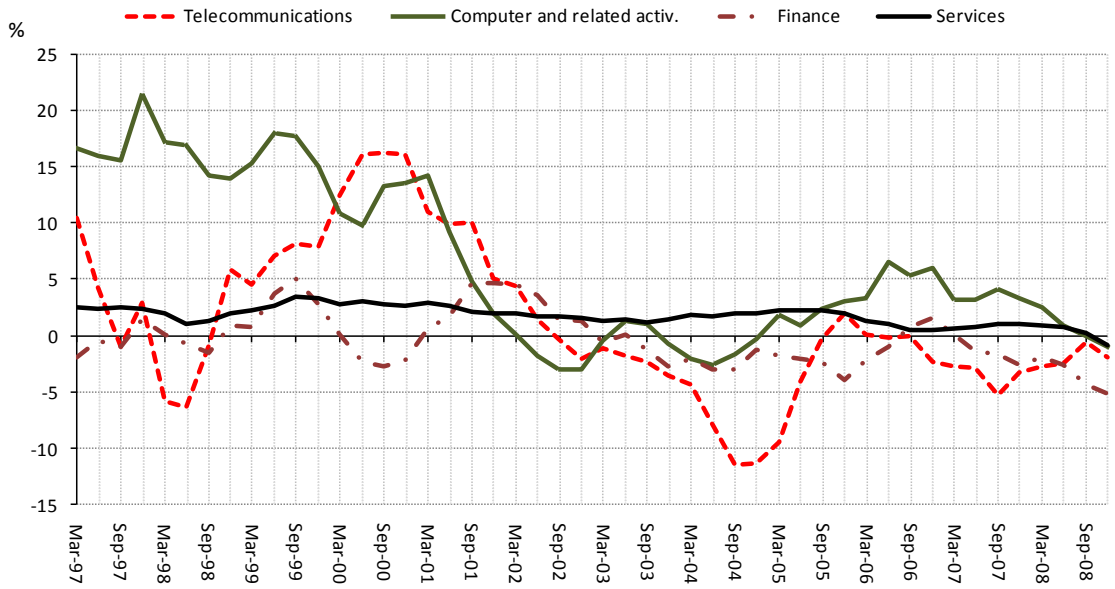


Note: Data are for the Great Britain (North Ireland is not taken into account)

Source: National Statistics Office, May 2009.

Figure 7. Growth in quarterly employment in ICT and selected services, March 1997 – December 2008

Year-on year percentage change, number of employee jobs, 3-month moving average



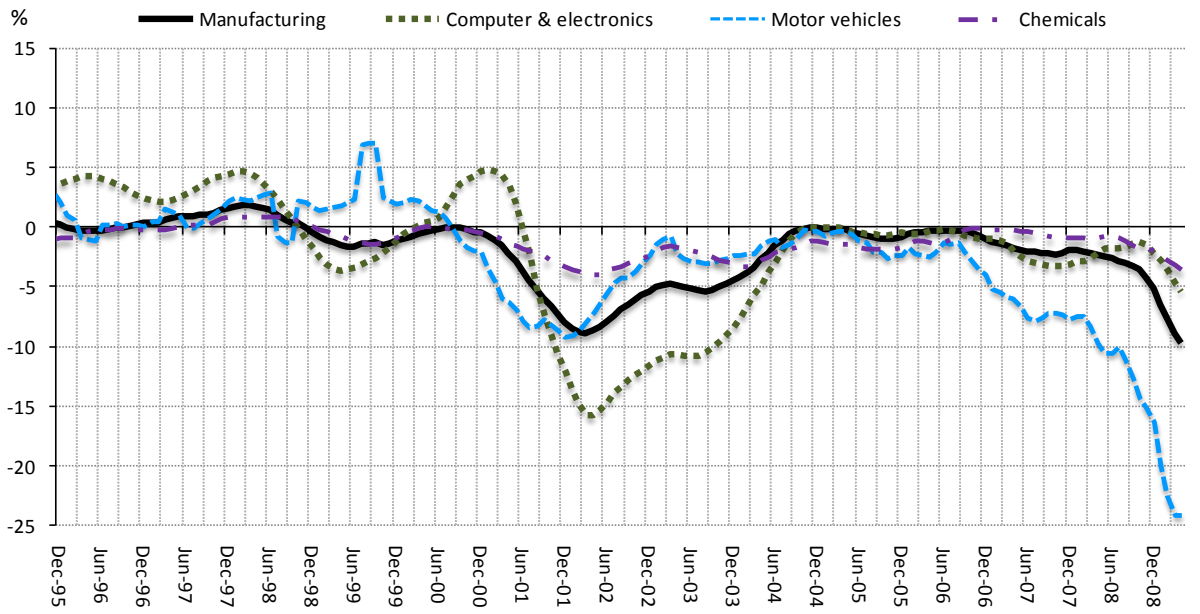
Note: Data are for the Great Britain (North Ireland is not taken into account)

Source: National Statistics Office, May 2009.

UNITED STATES

Figure 8. Growth in monthly employment in selected manufacturing sectors, December 1995 – April 2009

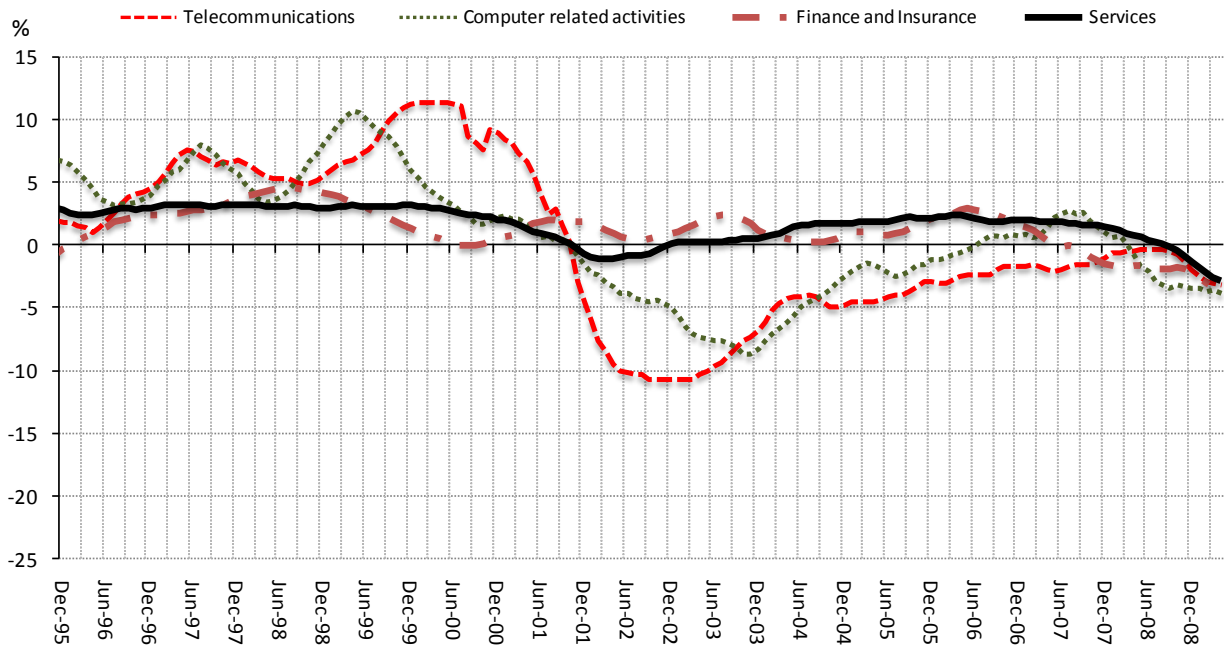
Year-on-year percentage change, number of employees, seasonally adjusted, 3-month moving average



Source: U.S. Bureau of Labour Statistics, May 2009.

Figure 9. Growth in monthly employment in ICT and selected services, December 1995 – April 2009

Year-on-year percentage change, number of employees, seasonally adjusted, 3-month moving average

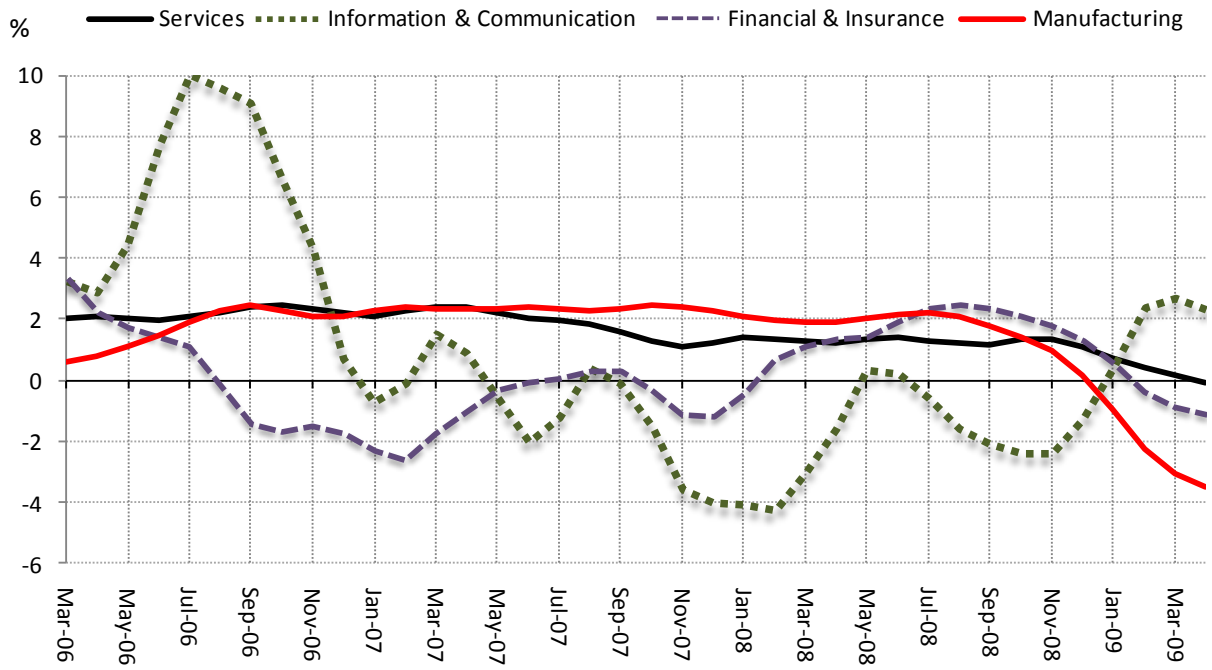


Source: U.S. Bureau of Labour Statistics, May 2009.

CHINESE TAIPEI

Figure 10. Growth in monthly employment in selected services in Chinese Taipei, March 2006 - April 2009

Year-on-year percentage change, thousand persons, 3-month moving average



Source: Directorate-General of Budget, Accounting and Statistics, June 2009.