Sam Zeini, Markus Tünte, Jun Imai and Karen Shire

**Appendix to Chapter 2**

The comparative construction of three different measures of the knowledge economy presented in Chapter 2 required that a number of decisions and compromises be made in the type of data and measures employed, with implications for bias and for the analysis of the quality of work in the knowledge economy. These decisions and their consequences, details about the construction of the *new sector, new occupations and new employment forms* measures and the detailed data tables are documented in this appendix. This appendix aims especially at making our methods and data transparent, in order to invite replication of our analysis with better and updated data sources. By 2007 major revisions of classifications of industrial activities and occupations will become available in a number of countries, improving the measurement and analysis of the knowledge economy.

Our measurement strategy focused on constructing *sector* measures of the knowledge economy – the ICT sector, the Information Sector and the Knowledge-Intensive Services sector, as described in Chapter 2. Within these new sectors, we undertake an analysis of new occupations and new forms of employment, in line with the conceptualization of the knowledge economy developed in Chapter 1 (Walby in this volume). This strategy diverges from an earlier study of the 'information economy' (Dostal 1996) which used *occupational* and *work task* indicators in constructing a 'fourth sector.' Like this earlier research, the new measures of economic activities we utilize cut across the traditional three sectors (primary, manufacturing and services) to re-group activities in ways that capture the development of a knowledge economy. In contrast to the 'fourth sector' approach, we aim to engage in an analysis of occupational formations and other structural variables within these new economic activities, rather than viewing occupations as constitutive of the knowledge economy. This is especially necessary in a comparative analysis, since occupations are not simply an outcome

of economic developments, but rather formed by social institutions and political processes as well. The same holds for non-regular forms of employment, which, depending on the national context, are shaped by political and social regulatory processes, and not simply by the decisions of firms.

The decision to measure the knowledge economy in relation to *new sectors* overrode other considerations in choosing data and constructing measures. Thus, we chose to use enterprise survey data instead of labor force or census data, despite the absence of broader data on employment in labor force surveys, because only the enterprise surveys in all four countries had enough detail in their classifications of economic activities to permit the construction of the three different sector measures. The decision in turn restricted the extent to which we could engage in occupational or employment form analyses in comparison. Thus, we were only able to examine *new occupations* in the ICT sector.

With the possible exception of Japan, where detailed unpublished data is very restricted, even for scientific purposes, deeper national analyses are possible in most other countries using alternative data sources, e.g. census or labor force surveys. Conversion as well as access problems prohibited us from utilizing these better data sources. Nonetheless, we hope to invite exactly such deeper national-level analyses by making our data and measures transparent.

## Constructing the Three Sector Measures

### *New Sector Sources and Resources*

The conceptual issues related to the development and use of new sector measures of the knowledge economy have been discussed in Chapter 2. The individual industries which comprise these sectors have also been detailed in Chapter 2. Here we focus on sources and resources useful for the construction and use of these measures in future research. None of the measures are readily available in international or national data sources, and thus require construction by researchers. Conversion resources provided in the next section of this appendix will aid in replicating our research. Here we focus on the sources and resources related to the development and use of these measures. All three -- the ICT, Information and Knowledge-Intensive Services sectors -- have been developed by international bodies, and at present have been largely underutilized by national statistical agencies in measuring economic development. A partial exception is the ICT sector, which has gained the most attention from national-level actors. Nonetheless, both the Knowledge-Intensive Sector and the ICT sector have been the subject of extensive analysis by international bodies and the major resources documenting developments in these sectors on an annual basis are listed below in Table 2.A1.

**Table 2.A1: New Sector Sources and Resources**

| Sector | Source | Classificatory Level | Resources |
|---|---|---|---|
| ICT | OECD | 3-digit and 4-digit | Annual ICT indicators published by the OECD Directorate for Science Technology and Industry (www1.oecd.org/sti/ICTindicators) and the regular OECD Science, Technology and |

| | | | |
|---|---|---|---|
| | | | Industry Scoreboards (www1.oecd.org/sti/scoreboard) |
| Information | UN | 3-digit and 4-digit | See unstats.un.org where discussions on improving the sector measure are ongoing |
| Knowledge-Intensive Services | EU, also OECD | 2-digit | See EU Employment in Europe 2001 publication (www.eu.int/comm/employment_social) |

***Classifications of Economic Activities***

The International Standard of Industrial Classifications (ISIC) developed by the UN permits conversion of national classification schemes to the international standard, for the purpose of engaging in comparisons. At the highest level of aggregation (one-digit classifications), conversion is quite simple. The measures of the knowledge economy we employ however, are all at lower levels of aggregation (two-digit for the Knowledge-Intensive Services sector, three- and four-digit for the Information and ICT sectors). For example, with two-digit aggregated data it is possible to compare employment in the 'Computer and related activities' (ISIC Rev. 3, 'two-digit' Code 72) industry, but not in the 'data processing' (ISIC Rev. 3, 'three digit' Code 7230) or 'software publishing' (ISIC Rev. 3, 'four-digit' Code 7221) industries. The best conversions are available for European Union countries, which have their own unified standards linked to the ISIC, the NACE. The US standard is most detailed, and required us to make a number of ad-hoc decisions about how to re-aggregate the data. [1] The Japanese standards are becoming more closely linked to ISIC, but at the time of publication, the conversion schemes available to the authors required that we use the Japanese classifications from 1993 (2002 is already in use in Japan). A new revision of ISIC (Rev. 3.1)

[1] A documentation of our re-aggregation decisions is available from the authors upon request (shire@uni-duisburg.de).

has been developed, but national-level standard conversions were not yet available for all four countries. Table 2.A2 lists the national standards used to convert the data to ISIC Rev. 3 and sources for conversion tables. We expect that improved classifications and conversions will be available soon for better estimates of the *new sectors* in comparative research.

**Table 2.A2: National Industrial Classifications converted to ISIC Rev. 3**

| Country | Classification | Resources for Conversions |
|---|---|---|
| | ISIC Rev 3 | See link for Correspondence at unstats.un.org |
| Britain | NACE Rev. 1 | forum.europa.eu.int/irc/dsis/ bmethods/info/data/new/classifications /nace_en.pdf |
| Germany | WZ 93 | www.destatis.de/allg/d/klassif/wz93.htm |
| Japan | JSIC 1993 | See link for Statistical System at www.stat.go.jp |
| US | NAICS 1997 | See source for ISIC Rev. 3 above |

**Survey Data Sources and Sources of Bias in Using Enterprise Surveys**

While census or labor force surveys are better sources for employment data, the need for data at the two- to four-digit levels of industrial classifications strongly influenced our decision to use enterprise rather than other surveys. Access to data also played a role in this decision. In Japan the census is not released for scientific use. In both the UK and US data access is very good for census as well as labor force surveys. Germany had no optimal source of data for our analytical purposes. A full population census has not been undertaken in Germany since the 1980s, the German micro-census only includes three-digit aggregations of economic activities, and all types of enterprise and employment surveys we could access were based mainly or partly on socially insured employment (thus excluding new forms of employment

associated with the knowledge economy). In order to control for methodological effects in using different types of surveys in each country, we thus decided to use the enterprise surveys in all cases.

***Survey Access***

Unpublished survey data was most easily available and at the greatest level of detail from Britain and the US. The US classifications in use in a number of data sources are the finest to date, allowing for a much more detailed analysis of new sectors and new occupations. [2] In Japan we were only able to gain access to the Japanese enterprise survey. In Germany, the enterprise survey has the same problems in estimating non-standard forms of employment as most other alternatives. The best source for employment data, the German micro-census, has economic activities aggregated at the three-digit rather than four-digit level. Follow-ups underway in Germany and Britain at the time of publication do point to differences in the size and composition of the three sectors, when micro-census or labor force data is used instead. Another factor which will improve the accuracy of our analysis is the release of new industrial classifications in all four countries, not yet fully available or not available with standard conversions at the time of publication.

***New Occupations***

Disaggregated occupational data sources finer than the one-digit level are less often available from national data collection agencies than detailed industrial classification. Categorizations of occupational data are also very difficult to compare cross-nationally. The ILO's International Standard Classification of Occupations 1968 and 1988 (ISCO 68, ISCO 88) is

[2] The NAICS in use since 2002 in North America allows for finer distinctions since it includes new activities like 'internet publishing' now grouped with other activities in the ISIC classifications. Current discussions in the UN refer to the NAICS in improving the information sector measure. A more accurate comparative use of this sector measure is however, unlikely before 2007 when the ISIC revision is complete and the alignment between national measures takes new economic activities more consistently into account. (see discussion protocols at unstats.un.org, 'Information Sector').

used in all four countries, but only ISCO 88 conversions are considered useful for comparison. Unpublished data is available from the ILO, but only for the nine aggregated occupational groupings (labor.sta.ilo.org). Japan only converts to ISCO 68, and until recently, this older standard was still quite commonly used in German statistical surveys. We could find no one single best source of data for analyzing new occupations, since even unpublished survey data does not tend to record occupations at a three- or four-digit level of measurement. In all four countries however, national governments had conducted specific surveys of ICT employment, with detailed occupational breakdowns.

***Employment Forms***

As Gottfried (in this volume) makes clear, non-standard employment forms are shaped by national regulatory systems, a fact which raises a number of problems in engaging in comparisons. Further, the four national enterprise surveys had no comparably detailed data on non-standard employment. The Japanese data in this respect contained the most detailed measures. The German data only included part-time employment, but did not include low wage/low hours part-time work not covered by social insurance schemes. Nor did the German data cover self-employed. The US data included hours worked, but not classified as part- or full-time. Thus, the analysis of non-standard employment in Chapter 2 is restricted to three countries where data on part-time work was available (Britain, Germany and Japan). In the German case, one sector of part-time work dominated by female workers is not represented in the data. The use of national labor force surveys or census data in the future will improve the basis for research about the expansion of non-standard work in the context of the knowledge economy.

***Bias***

A major concern in using enterprise rather than census or labor force surveys lay in

controlling possible sources of bias in the coverage of employment in enterprise surveys (employment in public sector and small firms as well as private and large firms, service sector as well as production) and the implications of coverage problems for an analysis of gender and the knowledge economy. In all four countries, alongside private sector firms, the service and the public sectors were included in the enterprise survey. All forms of employment, including self-employment, were counted in the British and Japanese enterprise surveys. The US data excluded self-employment and workers in private households. The German data posed the most serious problems, since civil servants, low hours part-time work and self-employment were not included. The coverage of the enterprise surveys in the four countries is presented in Table 2.A3.

**Table 2.A3: Characteristics of the Enterprise Surveys in Britain, Germany, Japan and the US**

| Country | Name of Survey | Sample Size and Selection | Sources of possible Bias |
|---|---|---|---|
| Britain | Annual Business Inquiry, Office of National Statistics | Stratified random sample based on firm size, region and industry. All large firms (with 250 employees or more) are included in the survey, and a rotating sample of small and medium size firms is sampled every year. Without North Ireland and Scotland the sample size was 68,000 firms. | The regions North Ireland and Scotland were eliminated from the sample, since industrial classifications finer than the 2-digit level were not available for these regions |
| Germany | Enterprise Survey conducted by the | Full population survey of all registered enterprises in both the | The German data has a number of serious |

| | | | |
|---|---|---|---|
| | German Federal Statistical Office | public and private sectors with at least one socially insured employee. The sample covers a total of 2,132,811 firms. | sources of bias. While the public and private sectors are included, self-employed and forms of employment not included in social insurance programs (civil servants and short-hours/low-wage part-time work (mini-jobs)) are not counted. Thus all sectors are underestimated; so is female employment lower without 'mini-jobs'. |
| Japan | Establishment and Enterprise Census (*Jigyousho tokei chousa*) | Full population survey of 6,138,354 private establishments plus all public and unincorporated enterprises at all levels of the public sector. | Industrial classifications at 3-digit may overestimate some aspects of ICT and Information sectors. |
| USA | Current Employment Survey (CES) | Stratified sample includes 390,000 enterprises, based on firm size, sector and region. Sample includes all enterprises with 250 or more employees, and a representative sampling of small and medium size | Self-employment and workers in private households are not included. This also means that forms of solo-self-employed in the |

| | | | |
|---|---|---|---|
| | | firms. | knowledge economy are not included in the enterprise sample. |

**Three Sector Data**

National data converted to ISIC Rev. 3 codes is presented by country for each of the three sectors. The tables include notes, repeating the survey sources and detailing conversion and data details specific to each sector and country.

**Table 2.A4: ICT Sector Britain 2001**

| Economic Activity | ISIC Rev 3 | Male | | | Female | | | Total |
|---|---|---|---|---|---|---|---|---|
| | | Full Time | Part Time | Sub-Total | Full Time | Part Time | Sub-Total | |
| Manufacture of office, accounting and computing machinery | 3000 | 29700 | 500 | 30200 | 11200 | 1600 | 12800 | 43000 |
| Manufacture of electrical machinery and apparatus | 3130 | 10300 | 200 | 10400 | 3900 | 700 | 4600 | 15100 |
| Manufacture of radio, television and communication equipment and apparatus | 3210 | 25100 | 600 | 25700 | 9700 | 1800 | 11500 | 37200 |
| Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy | 3220 | 31000 | 400 | 31400 | 10200 | 1700 | 11900 | 43300 |
| Manufacture of television and radio receivers, sound or video recording or reproducing apparatus, and associated goods | 3230 | 19800 | 500 | 20300 | 7400 | 1200 | 8600 | 28900 |
| Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment | 3312 | 54600 | 900 | 55400 | 15300 | 3200 | 18500 | 74000 |
| Manufacture of industrial process control equipment | 3313 | 6600 | 100 | 6800 | 1300 | 400 | 1800 | 8500 |
| Post and telecommunications | 6420 | 158200 | 6800 | 165000 | 64000 | 18900 | 82800 | 247900 |
| Renting of office machinery and equipment (including computers) | 7123 | 1700 | 100 | 1900 | 800 | 300 | 1100 | 2900 |
| Hardware consultancy | 7210 | 9000 | 1000 | 10000 | 4500 | 2700 | 7300 | 17300 |
| Software publishing / Other software consultancy and supply | 7220 | 164600 | 12600 | 177200 | 79500 | 35100 | 114500 | 291800 |
| Data processing | 7230 | 33400 | 900 | 34300 | 17400 | 3800 | 21200 | 55500 |
| Data base activities and on-line distribution of electronic content | 7240 | 5300 | 500 | 5700 | 3400 | 1500 | 4900 | 10700 |
| Maintenance and repair of office, accounting and computing | 7250 | 12400 | 600 | 13000 | 4500 | 1800 | 6300 | 19200 |
| Other Computer related activities | 7290 | 58600 | 7000 | 65600 | 31900 | 17700 | 49600 | 115200 |
| Total ICT sector | | 620300 | 32700 | 652900 | 265000 | 92400 | 357400 | 1010500 |

Source: Annual Business Inquiry (ABI) December 2001
Conversions by Sam Zeini

**Table 2.A5: Information Sector Britain 2001**

| Economic Activity | ISIC Rev 3 | Male | | | Female | | | Total |
|---|---|---|---|---|---|---|---|---|
| | | Full Time | Part Time | Sub-Total | Full Time | Part Time | Sub-Total | |
| Publishing of books, brochures and other publications | 2211 | 14900 | 900 | 15800 | 13200 | 3300 | 16500 | 32300 |
| Publishing of newspapers, journals and periodicals | 2212 | 50100 | 4400 | 54500 | 38000 | 11400 | 49400 | 103900 |
| Publishing of music | 2213 | 1500 | 100 | 10000 | 4500 | 2700 | 7300 | 17300 |
| Other publishing | 2219 | 8300 | 600 | 8900 | 5300 | 2600 | 7900 | 16800 |
| Telecommunications | 6420 | 158200 | 6800 | 165000 | 64000 | 18900 | 82800 | 247900 |
| Software publishing | 7220 | 164600 | 12600 | 177200 | 79500 | 35100 | 114500 | 291800 |
| Data processing | 7230 | 33400 | 900 | 34300 | 17400 | 3800 | 21200 | 55500 |
| Data base activities and on-line distribution of electronic content | 7240 | 5300 | 500 | 5700 | 3400 | 1500 | 4900 | 10700 |
| Motion picture and video production and distribution | 9211 | 9100 | 1900 | 11000 | 7000 | 4100 | 11100 | 22100 |
| Motion picture projection | 9212 | 4300 | 5000 | 9200 | 2800 | 5300 | 8000 | 17200 |
| Radio and television activities | 9213 | 37400 | 3900 | 41200 | 27800 | 9000 | 36800 | 78000 |
| News agency activities | 9220 | 6000 | 300 | 6300 | 3400 | 800 | 4200 | 10500 |
| Library and archives activities | 9231 | 12200 | 4700 | 16900 | 9400 | 13300 | 22800 | 39700 |
| Total Information sector | | 505300 | 42600 | 556000 | 275700 | 111800 | 387400 | 943700 |

Source: Annual Business Inquiry (ABI) December 2001
Conversions by Sam Zeini

**Table 2.A6: Knowledge Intensive Sector Britain 2001**

| Economic Activity | ISIC Rev 3 | Male | | | Female | | | Total |
|---|---|---|---|---|---|---|---|---|
| | | Full Time | Part Time | Sub-Total | Full Time | Part Time | Sub-Total | |
| Water Transport | 61 | 9250 | 1750 | 11000 | 3000 | 2000 | 5250 | 16250 |
| Air Transport | 62 | 45500 | 2750 | 48250 | 33750 | 9000 | 42500 | 90500 |
| Post and telecommunications | 64 | 356500 | 39500 | 396000 | 99500 | 40750 | 140500 | 536250 |
| Financial intermediation | 65 | 237000 | 18750 | 255750 | 240500 | 93000 | 333500 | 589750 |
| Insurance and pension funding, except compulsory social security | 66 | 95250 | 3750 | 98750 | 96250 | 25750 | 121750 | 220500 |
| Activities auxiliary to financial intermediation | 67 | 109250 | 7250 | 117000 | 96000 | 29750 | 125750 | 242500 |
| Real estate activities | 70 | 151500 | 19500 | 171250 | 114250 | 73250 | 187000 | 358000 |
| Renting of machinery and equipment without operator & of personal & household goods | 71 | 82000 | 11500 | 94000 | 34750 | 26000 | 61000 | 154500 |
| Computer and related activities | 72 | 273000 | 16500 | 289250 | 159750 | 54250 | 214250 | 503500 |
| Research and development | 73 | 50250 | 4000 | 54250 | 39500 | 9500 | 49000 | 103250 |
| Other business activities | 74 | 1239000 | 212250 | 1451000 | 798250 | 543500 | 1342000 | 2793000 |
| Education | 80 | 455250 | 155250 | 611000 | 658750 | 810500 | 1467000 | 2080000 |
| Health and social work | 85 | 327250 | 122000 | 449000 | 993500 | 1211000 | 2205000 | 2654000 |
| Recreational, cultural & sporting acts | 92 | 224750 | 88500 | 313000 | 173250 | 185000 | 358250 | 671750 |
| Total Knowledge Intensive Sector | | 3655750 | 703250 | 4359500 | 3541000 | 3113250 | 6652750 | 11013750 |

Note: This table is based on an average of quarterly data, not the Dec 01 data reported in the other British tables
Source: Annual Business Inquiry (ABI) Average of 2001 quarterly data
Conversions by Sam Zeini

**Table 2.A7: ICT Sector Germany 2001**

| Economic Activity | ISIC Rev 3 | Male | | | Female | | | Total |
|---|---|---|---|---|---|---|---|---|
| | | Full Time | Part Time | Sub-Total | Full Time | Part Time | Sub-Total | |
| Manufacture of office, accounting and computing machinery | 3000 | 38419 | 1163 | 39582 | 14776 | 2494 | 17270 | 56852 |
| Manufacture of electrical machinery and apparatus | 3130 | 22206 | 132 | 22338 | 10591 | 1012 | 11603 | 33941 |
| Manufacture of radio, television and communication equipment and apparatus | 3210 | 60836 | 2722 | 63558 | 28955 | 4456 | 33411 | 96969 |
| Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy | 3220 | 54369 | 897 | 55266 | 23444 | 2538 | 25982 | 81248 |
| Manufacture of television and radio receivers, sound or video recording or reproducing apparatus, and associated goods | 3230 | 22485 | 205 | 22690 | 12255 | 1263 | 13518 | 36208 |
| Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment | 3312 | 149381 | 1937 | 151318 | 59049 | 9099 | 68148 | 219466 |
| Manufacture of industrial process control equipment | 3313 | 10327 | 151 | 10478 | 3182 | 592 | 3774 | 14252 |
| Post and telecommunications | 6420 | 64017 | 1782 | 65799 | 28428 | 4456 | 32884 | 98683 |
| Renting of office machinery and equipment (including computers) | 7123 | 857 | 18 | 875 | 695 | 102 | 797 | 1672 |
| Hardware consultancy | 7210 | 9769 | 343 | 10112 | 2907 | 544 | 3451 | 13563 |
| Software publishing / Other software consultancy and supply | 7220 | 174152 | 7514 | 181666 | 60616 | 10698 | 71314 | 252980 |
| Data processing | 7230 | 41324 | 1880 | 43204 | 21457 | 5446 | 26903 | 70107 |
| Data base activities and on-line distribution of electronic content | 7240 | 747 | 28 | 775 | 430 | 64 | 494 | 1269 |
| Maintenance and repair of office, accounting and computing | 7250 | 12881 | 233 | 13114 | 3247 | 585 | 3832 | 16946 |
| Other Computer related activities | 7290 | 5712 | 285 | 5997 | 2183 | 395 | 2578 | 8575 |
| Total ICT sector | | 667482 | 19290 | 686772 | 272215 | 43744 | 315959 | 1002731 |

Note: Employment only covers socially insured employed
Source: Enterprise Survey June 30, 2001, Conversion by Sam Zeini

**Table 2.A8: Information Sector Germany 2001**

| **Economic Activity** | ISIC | **Male** | | | **Female** | | | **Total** |
|---|---|---|---|---|---|---|---|---|
| | Rev. 3 | Full Time | Part Time | Sub-Total | Full Time | Part Time | Sub-Total | |
| Publishing of books, brochures and other publications | 2211 | 20963 | 1205 | 22168 | 26418 | 6418 | 32836 | 55004 |
| Publishing of newspapers, journals and periodicals | 2212 | 28673 | 4115 | 32788 | 20757 | 13305 | 34062 | 66850 |
| Publishing of music | 2213 | 1108 | 36 | 1144 | 476 | 84 | 560 | 1704 |
| Other publishing | 2219 | 1300 | 200 | 1500 | 1864 | 544 | 2408 | 3908 |
| Telecommunications | 6420 | 64017 | 1782 | 65799 | 28428 | 4456 | 32884 | 98683 |
| Software publishing / Other software consultancy and supply | 7220 | 174152 | 7514 | 181666 | 60616 | 10698 | 71314 | 252980 |
| Data processing | 7230 | 41324 | 1880 | 43204 | 21457 | 5446 | 26903 | 70107 |
| Data base activities and on-line distribution of electronic content | 7240 | 747 | 28 | 775 | 430 | 64 | 494 | 1269 |
| Motion picture and video production and distribution | 9211 | 13707 | 1237 | 14944 | 11382 | 1424 | 12806 | 27750 |
| Motion picture projection | 9212 | 3358 | 2043 | 5401 | 2753 | 2359 | 5112 | 10513 |
| Radio and television activities | 9213 | 29253 | 3154 | 32407 | 22266 | 5506 | 27772 | 60179 |
| News agency activities | 9220 | 3553 | 395 | 3948 | 3938 | 999 | 4937 | 8885 |
| Library and archives activities | 9231 | 3052 | 411 | 3463 | 6611 | 3649 | 10260 | 13723 |
| Total Information sector | | 385207 | 24000 | 409207 | 207396 | 54952 | 262348 | 671555 |

Note: Employment only covers socially insured employed
Source: Enterprise Survey June 30, 2001
Conversions by Sam Zeini

**Table 2.A9: Knowledge Intensive Sector Germany 2001**

| Economic Activity | ISIC Rev 3 | Male | | | Female | | | Total |
|---|---|---|---|---|---|---|---|---|
| | | Full Time | Part Time | Sub-Total | Full Time | Part Time | Sub-Total | |
| Water Transport | 61 | 21751 | 175 | 21926 | 5051 | 590 | 5641 | 27567 |
| Air Transport | 62 | 13466 | 483 | 13949 | 13307 | 2447 | 15754 | 29443 |
| Post and telecommunications | 64 | 134725 | 23240 | 157965 | 81678 | 6952 | 88630 | 309164 |
| Financial intermediation | 65 | 313822 | 6980 | 320802 | 327821 | 100559 | 428380 | 749182 |
| Insurance and pension funding, except compulsory social security | 66 | 116885 | 2497 | 119382 | 88851 | 19633 | 108484 | 227866 |
| Activities auxiliary to financial intermediation | 67 | 36693 | 1432 | 38125 | 43575 | 13057 | 56632 | 94757 |
| Real estate activities | 70 | 117645 | 8635 | 126280 | 97037 | 27881 | 124918 | 251198 |
| Renting of machinery and equipment without operator & of personal & household goods | 71 | 38955 | 3548 | 42503 | 18771 | 4124 | 22895 | 65398 |
| Computer and related activities | 72 | 244585 | 10283 | 254868 | 90840 | 17732 | 108572 | 363440 |
| Research and development | 73 | 70718 | 9528 | 80246 | 41505 | 15753 | 57258 | 137504 |
| Other business activities | 74 | 1062885 | 71806 | 1134691 | 824113 | 321564 | 1145677 | 2280368 |
| Education | 80 | 284117 | 69758 | 353875 | 391386 | 288250 | 679636 | 1033511 |
| Health and social work | 85 | 524685 | 65350 | 590035 | 1618640 | 759382 | 2378022 | 2968057 |
| Recreational, cultural & sporting acts | 92 | 148587 | 19166 | 167753 | 120507 | 37861 | 158368 | 326121 |
| Total Knowledge Intensive sector | | 3129519 | 292881 | 3422400 | 3763082 | 1615785 | 5378867 | 8863576 |

Note: Employment only covers socially insured employed. Category 62 does not include part-time workers in the space industry, because numbers were small enough to pose problems for the anonymity of respondents.
Source: Enterprise Survey June 30, 2001
Conversion by Sam Zeini

**Table 2.A10: ICT Sector Japan 2001**

| Economic Activity | ISIC Rev 3 | Male | | | Female | | | Total |
|---|---|---|---|---|---|---|---|---|
| | | Full Time | Part Time | Total | Full Time | Part Time | Total | |
| Manufacture of office, accounting and computing machinery | 3000 | 95700 | 4223 | 103088 | 30189 | 12039 | 43320 | 146408 |
| Manufacture of electrical machinery and apparatus | 3130 | 44038 | 1742 | 47700 | 8289 | 7164 | 16154 | 63854 |
| Manufacture of radio, television and communication equipment and apparatus | 3210 | 406809 | 27013 | 455147 | 156805 | 89074 | 255921 | 711068 |
| Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy | 3220 | 144045 | 6046 | 156318 | 49153 | 23209 | 74504 | 230822 |
| Manufacture of television and radio receivers, sound or video recording or reproducing apparatus, and associated goods | 3230 | 241118 | 15164 | 284091 | 81219 | 44666 | 136397 | 420488 |
| Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment | 3312 | 77256 | 3537 | 88949 | 20097 | 12888 | 35528 | 124477 |
| Manufacture of industrial process control equipment | 3313 | 29319 | 1233 | 32889 | 6950 | 4974 | 12555 | 45444 |
| Post and telecommunications | 6420 | 108890 | 12144 | 156161 | 52963 | 37903 | 95214 | 251375 |
| Renting of office machinery and equipment (including computers) | 7123 | 6173 | 353 | 7235 | 2643 | 1067 | 3841 | 11076 |
| Hardware consultancy | 7210 | | | | | | | |
| Software publishing and other software consultancy and supply | 7220 | 415223 | 19419 | 464748 | 91639 | 17247 | 115036 | 579784 |
| Data processing | 7230 | 120839 | 14703 | 148809 | 53215 | 46577 | 109101 | 257910 |
| Data base activities and on-line distribution of electronic content | 7240 | 124704 | 15309 | 154374 | 54883 | 47347 | 111811 | 265838 |
| Maintenance and repair of office, accounting and computing | 7250 | 56630 | 3740 | 65072 | 7190 | 5138 | 13513 | 78585 |
| Other Computer related activities | 7290 | NA | NA | NA | NA | NA | NA | NA |
| Total ICT sectors | | 1576541 | 102644 | 1826565 | 505917 | 274533 | 826735 | 2652953 |

Note: The JSIC has no equivalent code to ISIC 7210, so this row is left blank

Source: Establishment and Enterprise Census (Jigyousho tokei chousa) 2001. Conversions by Jun Imai

**Table 2.A11: Information Sector Japan 2001**

| Economic Activity | ISIC Rev 3 | Male | | | Female | | | Total |
|---|---|---|---|---|---|---|---|---|
| | | Full Time | Part Time | Sub-Total | Full Time | Part Time | Sub-Total | |
| Publishing of books, brochures and other publications | 2211 | 44377 | 5059 | 57923 | 22289 | 11507 | 36994 | 94917 |
| Publishing of newspapers, journals and periodicals | 2212 | 53265 | 3844 | 60477 | 8580 | 4403 | 14001 | 74478 |
| Publishing of music | 2213 | 2568 | 209 | 3008 | 961 | 450 | 1544 | 4552 |
| Other publishing | 2219 | 45278 | 6734 | 60280 | 12962 | 5549 | 20687 | 80967 |
| Post and telecommunications | 6420 | 135197 | 12144 | 156161 | 52963 | 37903 | 95214 | 251375 |
| Software publishing | 7221 | 415223 | 19419 | 464748 | 91639 | 17247 | 115036 | 579784 |
| Data Processing | 7230 | 120839 | 14703 | 148809 | 53215 | 46577 | 109101 | 257910 |
| Data base activities and on-line distribution of electronic content | 7240 | 124704 | 15309 | 154374 | 54883 | 47347 | 111811 | 266185 |
| Motion picture and video production and distribution | 9211 | 28023 | 4865 | 39847 | 9660 | 3489 | 14820 | 54667 |
| Motion picture projection | 9212 | 2383 | 4203 | 7331 | 1191 | 6283 | 7863 | 15194 |
| Radio and television activities | 9213 | 30591 | 5074 | 42855 | 10621 | 3939 | 16364 | 59219 |
| News agency activities | 9220 | 17255 | 1869 | 20433 | 3302 | 2060 | 5867 | 26300 |
| Library and archives activities | 9231 | 68734 | 29875 | 104471 | 38519 | 61737 | 114120 | 218591 |
| Total information sector | | 891729 | 96796 | 1068773 | 283987 | 192426 | 517270 | 1586043 |

Note: The JSIC has no equivalent to the ISIC Rev. 3 code for 7210, thus this category is left empty for Japan. The JSIC code 329 covers both the ISIC Rev 3 codes 7221 and 7229, thus these are reported together for Japan

Source: Establishment and Enterprise Census (Jigyousho tokei chousa)
Conversions by Jun Imai

**Table 2.A12: Knowledge Intensive Sector Japan 2001**

| Economic Activity | ISIC Rev 3 | Male | | | Female | | | Total |
|---|---|---|---|---|---|---|---|---|
| | | Full Time | Part Time | Sub-Total | Full Time | Part Time | Sub-Total | |
| Water Transport | 61 | 38003 | 2638 | 48360 | 6226 | 1668 | 9673 | 58033 |
| Air Transport | 62 | 22170 | 912 | 23539 | 16728 | 3322 | 20098 | 43637 |
| Post and telecommunications | 64 | 183553 | 35460 | 228945 | 56471 | 54351 | 115950 | 344895 |
| Financial intermediation | 65 | 437643 | 14575 | 474358 | 246744 | 121391 | 377885 | 852243 |
| Insurance and pension funding, except compulsory social security | 66 | 183207 | 10828 | 227359 | 360286 | 50324 | 423506 | 650865 |
| Activities auxiliary to financial intermediation | 67 | 12155 | 617 | 14654 | 4620 | 1689 | 6404 | 21058 |
| Real estate activities | 70 | 258689 | 56853 | 606370 | 141187 | 83178 | 402258 | 1008628 |
| Renting of machinery and equipment without operator & of personal & household goods | 71 | 122657 | 47242 | 198157 | 43460 | 39028 | 93375 | 291532 |
| Computer and related activities | 72 | 536602 | 34122 | 613557 | 144854 | 63824 | 224137 | 837694 |
| Research and development | 73 | 244245 | 19677 | 269897 | 42025 | 35967 | 90952 | 360849 |
| Other business activities | 74 | 674856 | 55133 | 964431 | 273137 | 109124 | 459239 | 1423670 |
| Education | 80 | 1671472 | 353972 | 2143516 | 1411822 | 574478 | 2161697 | 4305213 |
| Health and social work | 85 | 880310 | 200227 | 1342844 | 2742039 | 1052825 | 4039878 | 5382722 |
| Recreational, cultural & sporting acts. | 92 | 259213 | 191340 | 524409 | 149971 | 248954 | 516590 | 1040999 |
| Total of Knowledge Intensive sector | | 5524775 | 1023596 | 7680396 | 5639570 | 2440123 | 8941642 | 16622038 |

Source: Establishment and Enterprise Census (Jigyousho tokei chousa)
Conversions by Jun Imai

**Table 2.A13: ICT Sector US 2001**

| Economic Activity | | Male | Female | Total |
|---|---|---|---|---|
| | ISIC Rev. 3 | Full Time | Full Time | |
| Manufacture of office, accounting and computing machinery | 3000 | 292850 | 162090 | 454940 |
| Manufacture of electrical machinery and apparatus | 3130 | 110020 | 84610 | 194630 |
| Manufacture of radio, television and communication equipment and apparatus | 3210 | 370450 | 270650 | 641100 |
| Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy | 3220 | 146350 | 87600 | 233950 |
| Manufacture of television and radio receivers, sound or video recording or reproducing apparatus, and associated goods | 3230 | 370250 | 200400 | 570650 |
| Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment | 3312 | 512260 | 296520 | 808780 |
| Manufacture of industrial process control equipment | 3313 | 184900 | 54200 | 239100 |
| Post and telecommunications | 6420 | 972800 | 798500 | 1771300 |
| Renting of office machinery and equipment (including computers) | 7123 | 0 | 0 | 0 |
| Hardware consultancy | 7210 | 362800 | 157500 | 520300 |
| Software publishing | 7221 | 176000 | 92900 | 268900 |
| Other software consultancy and supply | 7229 | 743200 | 340000 | 1083200 |
| Data processing | 7230 | 176500 | 204900 | 381400 |
| Data base activities | 7240 | 107400 | 83000 | 190400 |
| Maintenance and repair of office, accounting and computing | 7250 | 36900 | 11400 | 48300 |
| Other computer related activities | 7290 | 105700 | 44400 | 150100 |
| Total ICT sectors | | 3844330 | 2398720 | 6243050 |

Note: Breakdown for part-time workers are not included in the U.S. survey. The high level of disaggregation of the CES data required that we make a number of decisions about how to collapse and convert almost all of the individual activities into the appropriate ISIC Rev. 3 codes. A documentation of this exercise is available from the authors upon request (to shire@uni-duisburg.de).
Category 7123 is empty because no clear equivalent could be derived from the NAIC codes, which divide this industry into other non-equivalent codes.

Source: Current Employment Survey (CES) 2001
Conversions by Markus Tünte



**Table 2.A14: Information Sector: US 2001**

**Table 2.A15: Knowledge Intensive Sector US 2001**

| Economic Activity | ISIC Rev 3 | Male | Female | Total |
|---|---|---|---|---|
| Water Transport | 61 | 35900 | 18100 | 54000 |
| Air Transport | 62 | 347500 | 267800 | 615300 |
| Post and telecommunications | 64 | 1844200 | 1298600 | 3142800 |
| Financial intermediation | 65 | 841000 | 1980000 | 2821000 |
| Insurance and pension funding, except compulsory social security | 66 | 573800 | 953800 | 1527600 |
| Activities auxiliary to financial intermediation | 67 | 821200 | 1138800 | 1960000 |
| Real estate activities | 70 | 469200 | 351600 | 820800 |
| Renting of machinery and equipment without operator & of personal & household goods | 71 | 445000 | 221300 | 666300 |
| Computer and related activities | 72 | 1288700 | 745100 | 2033800 |
| Research and development | 73 | 313700 | 218400 | 532100 |
| Other business activities | 74 | 8010700 | 6959700 | 14970400 |
| Education | 80 | 980600 | 1444600 | 2425200 |
| Health and social work | 85 | 2682500 | 10770300 | 13452800 |
| Recreational, cultural & sporting acts | 92 | 1835000 | 1713800 | 3548800 |
| Total Knowledge Intensive sector | | 19820900 | 27240200 | 47061100 |

Note: Breakdown for part-time workers is not included in the U.S. survey. The high level of disaggregation of the CES data required that we make a number of decisions about how to collapse and convert almost all of the individual activities into the appropriate ISIC Rev. 3 codes. A documentation of this exercise is available from the authors upon request (to shire@uni-duisburg.de).
Source: Current Employment Survey (CES)
Conversions by Markus Tünte