Intangible capital in the Netherlands: A benchmark

08

Myriam van Rooijen-Horsten, Dirk van den Bergen and Murat Tanriseven

Discussionpaper (08001)

Statistics Netherlands

Voorburg/Heerlen, 2008

Explanation of symbols

.	= data not available
*	= provisional figure
x	= publication prohibited (confidential figure)
–	= nil or less than half of unit concerned
–	= (between two figures) inclusive
0 (0,0)	= less than half of unit concerned
blank	= not applicable
2005-2006	= 2005 to 2006 inclusive
2005/2006	= average of 2005 up to and including 2006
2005/'06	= crop year, financial year, school year etc. beginning in 2005 and ending in 2006
2003/'04–2005/'06	= crop year, financial year, etc. 2003/'04 to 2005/'06 inclusive

Due to rounding, some totals may not correspond with the sum of the separate figures.

Publisher
Statistics Netherlands
Prinses Beatrixlaan 428
2273 XZ Voorburg

second half of 2008:
Henri Faasdreef 312
2492 JP The Hague

Prepress
Statistics Netherlands - Facility Services

Cover
TelDesign, Rotterdam

Information
Telephone .. +31 88 570 70 70
Telefax .. +31 70 337 59 94
Via contact form: www.cbs.nl/information

Where to order
E-mail: verkoop@cbs.nl
Telefax .. +31 45 570 62 68

Internet
http://www.cbs.nl

6008308001 X-10

Intangible capital in the Netherlands: A benchmark

Summary:

This paper comprises a first attempt to provide a comprehensive measure on spending on intangible capital in the Netherlands. We replicate the approach pioneered by Corrado, Hulten and Sichel (2004, 2005 and 2006) for the U.S. Their work suggests private sector expenditure (investment) on intangibles at about 13% (12%) of US GDP for the years 1998–2000. Our results, using a comparable method but lacking an estimate for own account organizational structure, show total spending on intangibles in the Netherlands at around 10 % of Netherlands GDP in the years 2001–2004. The implied investment figure is around 40 billon euro (8% of GDP). Differences and similarities in both methods and results are discussed. We also compare our results with recent work by Marrano and Haskel (2006), who suggest these figures are 11% (10%) of GDP in the UK in 2004.

Keywords: Intangible Capital, National Accounts

1. Introduction and background

Since September 2007 the national accounts of the Netherlands are expanded with a set of multi factor productivity statistics.[1] Capital inputs in these statistics are confined to capital as defined within the national accounting framework. Although the upcoming revision of the SNA (SNA 93 Rev.1)[2] will include a recommendation to capitalise R&D, for now intangible capital in the official productivity analyses of Statistics Netherlands (SN) will be confined to computer software, mineral exploration and evaluation, and entertainment, literary or artistic originals.[3] Research by Corrado, Hulten and Sichel (CHS) (2004, 2005, 2006)[4] suggests that investment (gross fixed capital formation in national accounts terminology) in these intangibles comprises only a small part of a more comprehensive list of intangible business investments that includes spending on innovative property (e.g. R&D) and economic competencies as well as software and other computerized information. CHS found that total business investment in intangibles in the USA was roughly the same as investment in tangible capital in 1999, i.e. approximately one trillion dollars. They argue that the magnitude of these estimates suggests that uncounted intangibles have a significant effect on the level of GDP, as well as on the rate of investment and the level of labour productivity. This is confirmed by their growth accounting results, including intangibles, presented in their 2006 paper.

In order to investigate the effect of the omission of these intangibles for the measurement of investment, GDP and productivity in the Netherlands, we aim to replicate the research done by CHS. In addition, our work elaborates on a conceptual discussion concerning the inclusion of intangibles within the asset boundary of the SNA that was previously published at Statistics Netherlands (van de Ven, 2000). In the present paper only benchmark estimates of the comprehensive range of intangibles are presented. Using national accounts figures where possible, a method similar to CHS is used to estimate expenditures and investment in intangibles for the years 2001–2004. Since the CHS work has recently also been replicated for the UK by Marrano and Haskel (MH, 2006), we also compare out results with those for the UK.[5]
In future work we aim to address further issues as: what is the contribution of intangible capital to output growth; and how does the inclusion of intangibles affect the allocation of output growth between capital formation and multifactor productivity growth.

In section two of this paper our methods for estimating investment in different types of intangibles, as well as the measurement issues surrounding them, are discussed. In section three benchmark results for the years 2001–2004 are presented and discussed. Section four comprises some concluding remarks as well as a more detailed description of our future plans.

---

1) For a description of methods behind productivity measurement at Statistics Netherlands see van den Bergen et al., 2007. In collaboration with Statistics Netherlands a Dutch database has also been compiled within the EU-KLEMS project. For the benefit of international comparisons EU-KLEMS productivity-statistics for the Netherlands sometimes differ from those published by Statistics Netherlands.
2) The new System of National Accounts is not finalized. However the registration of R&D as gross fixed capital formation has already been approved by the Statistical Commission. Here we refer to the draft version SNA 93 Rev.2.
3) The intangibles in the current Dutch national accounts further include transfer-of-ownership-costs on dairy quota, but these are currently excluded from the estimates presented in the present paper.
4) We highlight CHS here since we attempt to replicate their studies, but as they acknowledge, their work builds on work by Nakamura (1999, 2001, 2003); Brynjolffson and Yang (1999); Brynjolffson, Hitt, and Yang (2000); McGratten and Prescott (2000).
5) By May 2007, a study by Fukao et al. with results for Japan was published. However, the results for Japan have not been incorporated in the present paper.

2. Methods: Measuring investment in intangibles

Table 1 (obtained by MH, 2006) sets out the basic CHS method. The table shows that intangible investment may be grouped under three major headings: Computerized information, innovative property and economic competencies. Column 2 and 3 show the sources used to estimate expenditures by CHS and MH for the USA and the UK respectively. In the last column the sources used for the estimates presented in the current paper are summarized. Although most of our sources match those of CHS and MH quite closely, there are some important differences. In general, we make as much as possible use of national accounts data series for the Netherlands. Further details with regard to differences in results and methods between the current paper and CHS as well as MH are described in section 3. In the sections below our procedures for estimating investment in the different types of intangibles are described.

2.1 Computerized information: Software

Software is already included in the national accounts as an intangible asset. Investment in software is therefore directly taken from the Dutch national accounts. Until 2000, these investments were based on a survey of both purchases of software and own account spending on software. Due to budget cuts the relevant monetary questions in this survey were cancelled in 2001. From 2001 on, purchases of software are therefore based on figures on production, imports and exports of software. From this data, the domestic demand of software is determined. The private consumption of software, which is based on household surveys, is subsequently subtracted from the domestic demand to get investment in purchased software. From 2001 on, no data on own-account software is available, neither of volume changes nor levels. From 2001 onwards, it is therefore assumed that the development of levels of own account software equals the development of levels of purchases of software. In order to calculate volume changes, different prices indices are used for own account software and purchased software.

Spending on databases is included in the software figures. Estimates on software and databases cannot be separately distinguished.

Total spending on software (including databases) is estimated at 6.4 billion euro in 2004.

2.2 Innovative property

Following CHS, the innovative property category of intangibles reflects the scientific knowledge embedded in patents, licenses, and general (not patented) know-how and the innovative and artistic content in commercial copyrights, licenses, and designs. We classified this category into the subcategories R&D, mineral exploration and other innovative property. As will be described in more detail below, our method implies that only the estimates of R&D comprise an extension of the existing Dutch national accounts investment figures. All other types of assets that are part of the innovative property category are already included as intangible assets in the Dutch national accounts.

2.2.1 R&D

According to the new international National Accounting guidelines (SNA 93 Rev1) expenditure on R&D will in the near future be recorded as gross fixed capital formation instead of intermediate consumption.
In the Netherlands, data on R&D capital expenditure are obtained from the Dutch satellite accounts on knowledge, the so-called knowledge module. The knowledge

module is an addition to the core national accounts that is being developed to measure the role of knowledge in the economy in more detail. It comprises indicators with respect to R&D and ICT capital expenditure as well as costs of employer provided training. In anticipation of the upcoming revision of the SNA, R&D expenditure is capitalised in the knowledge module.

The main sources of the R&D data series estimated in the context of the knowledge module are three Frascati (OEDC 1993 and 2002) based surveys of R&D performers: a survey of enterprises, one of research institutes and one of universities. The gross expenditure on R&D, by origin and by industry, measured by these surveys is translated to R&D-supply and R&D-use according to national accounting conventions. The translation process, from Frascati-based gross expenditure on R&D to R&D supply (and R&D-use) comprises several important steps:

– The revaluation of the R&D expenditure data in order to obtain R&D output according to SNA guidelines. Non-market (general government) R&D production and own-account R&D production are valued by the sum of production costs. Market R&D production is assumed to coincide with the sales and purchases as directly observed in the R&D survey.
– The elimination of overlaps with software development. The ESA-1995 explicitly excludes the expenditures on R&D incurred in the production of software. In the Frascati Manual, which covers the R&D survey-data, R&D related to software development is in principle included. The capitalisation of R&D output may lead to a double count in the gross fixed capital formation figures of the national accounts.[6] Estimates indicate that R&D connected to software development can be substantial. A correction is made to prevent such double counting. The R&D survey (enterprises) and the survey for research institutes both include a question on the percentage of total R&D labour input that is devoted to ICT (in full time equivalents). This percentage is used to estimate the subtraction that must be made to avoid overlaps.

A more detailed description of the methods used to estimate R&D capital expenditure and the R&D capital stock in the Dutch knowledge module is given by Tanriseven *et al.* (2007) and by de Haan and van Rooijen-Horsten (2003, 2004 and 2007).

In the CHS studies, this R&D category of innovative property is called scientific R&D mainly because the National Science Foundation (NSF) survey, from which the R&D series are obtained to estimate scientific R&D, is designed to capture only innovative activity built on a scientific base of knowledge. However, the R&D data series for the Netherlands are based on R&D surveys that follow the Frascati Manual (OECD, 1993) and the revised SNA definition of R&D. This is a broader R&D concept than the 'scientific R&D' in the CHS studies. The SNA (and Frascati) definition of R&D that is covered by the R&D survey is broader:

'Research and [experimental] development consists of the value of expenditures on creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and use of this stock of knowledge to devise new applications. This does not extend to including human capital as assets within the System' (draft of the revised SNA V2, chapter 10: The Capital Account, §19.100).

In principle, therefore, the Dutch R&D survey data capture not only scientific R&D but also R&D in the financial services industries as well as R&D in social sciences and humanities[7]. For 2004, R&D expenditure in the financial services industries is estimated at 0.1 billion euro. Unfortunately figures on R&D in social sciences and humanities cannot be separately distinguished. They are included in the total R&D estimates. However, it is possible that the Dutch R&D survey results in underestimations of R&D in

6) As described above, software expenditure is already part of gross fixed capital formation in the national accounts.
7) The Frascati Manual explicitly states examples of R&D in banking and insurance, e.g. 'Mathematical research relating to financial risk analysis and R&D related to new or significantly improved financial services (new concepts for accounts, loans, insurance and saving instruments)'. For R&D in the social sciences and humanities no explicit examples are mentioned. It is however stated that 'The social sciences and humanities are covered in the Manual by including in the definition of R&D 'knowledge of man, culture and society.'.

these two industries, for example because R&D which is not undertaken on a systematic basis is excluded from the definition of R&D. Such “ad hoc” R&D is common in the financial services industries and in social sciences and humanities. We assume for the time being that the Dutch R&D survey correctly measures R&D in the financial services industries as well as R&D in social sciences and humanities.
Total R&D spending as presented in this paper is based on the total domestic use, including use by general government (government consumption). However, freely available R&D needs to be excluded from the estimations of R&D capital expenditure, because freely available R&D is not considered an asset. We assume freely available R&D to equal government consumption of R&D and therefore exclude this from R&D capital expenditure.[8)] Excluding government consumption from R&D implies that all non-market R&D output, produced by publicly funded R&D institutions (ISIC 73) and universities is excluded from R&D capital expenditure.

For 2004 the total R&D spending is estimated at 9.4 billion euro and R&D capital spending is estimated at 6.0 billion euro.

2.2.2 Mineral exploration and evaluation

For the estimation of investment in mineral exploration and evaluation in the Netherlands, data series from the Dutch national accounts are used. The national accounts estimates are based on data series with regard to the amount of exploratory drilling (by type of drilling and location) as well as data series on the average costs of exploratory drilling (by type of drilling and location, for a benchmark year). According to these estimations, investment in mineral exploration and evaluation was 0.2 billion euro in 2004.

2.2.3 Other innovative property

This category of intangible assets comprises all innovative property that is not included in the previous two sections. It mainly reflects the innovative and artistic content in commercial copyrights, licenses, and designs. In the CHS papers this category is called ‘non-scientific R&D’ which includes (parts of):

a) Development costs in the motion picture industry
b) Development costs in the radio and television, sound recording and book publishing industries
c) New product development costs in the financial services industries
d) New architectural and engineering designs
e) R&D in social sciences and humanities

As explained in section 2.2.1 it is assumed that, in the case of the Netherlands, c) and e) are already included in the R&D data series based on the R&D survey. As will be described in detail below, investment data series from the national accounts are used for all other estimates of intangible assets belonging to the category ‘other innovative property’.
For the estimations of categories a) and b) in the Netherlands, data series from the Dutch national accounts with regard to investment in entertainment, literary or artistic originals are used. These national accounts estimates are based on data series with regard to revenues from royalties and licences. From the data series on revenues, the value of new originals is estimated using assumptions on the age-efficiency of royalties and licences. For 2004, estimates of investment in entertainment, literary or artistic originals amount to 0.2 billion euro. These figures do not include imports. Imports of entertainment, literary or artistic originals are registered separately in the Dutch national

8) In the draft version of the new System of National Accounts, SNA 93 Rev.2., it is recommended that ‘In principle, R&D that does not provide an economic benefit to its owner does not constitute a fixed asset and should be treated as intermediate consumption’.
See also http://unstats.un.org/unsd/sna1993/draftingphase/pubChapterDetail.asp?ch=14

accounts. Examples of such imports are the lyrics of the greatest rock & roll band of the world, which are all registered in the Netherlands. Unfortunately it is difficult to separate figures with regard to imports of entertainment, literary or artistic originals from imports of brand equity. Furthermore, it has proven to be very difficult to measure these imports correctly. The estimates are currently based on financial flows. According to the Dutch national accounts, imports of entertainment, literary or artistic originals were 0.5 billion euro in 2004. Although this probably includes some imports of brand equity, the figures are included in the category 'other innovative property' here.

A large part of expenditure on category d), new architectural and engineering designs, is registered as investment in the national accounts. These national accounts data series are used in the present paper. However, presently they are included in the estimates of tangible capital investment (embedded in investments in dwellings, non-residential buildings and machinery and equipment) whereas for the purpose of the present paper they are separated from their tangible counterparts. The national accounts data series with regard to investment in new architectural and engineering designs are estimated as a percentage of the expenditure on the accompanying tangible capital (at the level of asset type by industry). According to these data series, investment in new architectural and engineering designs was 4.5 billion euro in 2004 (comprising around 74% of the total domestic use of new architectural and engineering designs).

2.3 Economic competencies

Following CHS, the economic competencies category of intangibles represents the value of brand names and other knowledge embedded in firm-specific human and structural resources. Three basic asset types are distinguished: brand equity, firm-specific human capital and organizational structure. None of these asset types are currently included in the national accounts as intangible assets.

2.3.1 Brand equity

In many businesses establishing brand names is an important precondition for commercial success. A solid brand name ensures a higher turnover and subsequently higher profits. The most common way of establishing a brand name is by expenditure on marketing and advertising. Expenditure with the purpose of strengthening the brand name may therefore be seen as an investment in brand equity. However, not all expenditure on marketing and advertising has the main purpose of strengthening a brand name. Employment advertisements, for example, have the recruitment of new personnel as a primary goal. While the brand name may be strengthened as a by-product, this can hardly be seen as the primary goal of the employment advertisement. Another example is government advertisement on ethical issues or public safety. A government campaign to stimulate drivers to buckle up is in no way strengthening a brand name. It should therefore be excluded from the investments in brand equity.

We use the following definition of investment in brand equity:
Investment in brand equity is that part of the expenditure on marketing and advertisement that has as the primary goal to increase the value of a brand name or to increase output over a period of more than one year.

This definition does not entail that spending on brand names needs to show an observable effect on strengthening the brand name or that output must be seen to increase for more than a year for the expenditure to be labelled as an investment. Like other assets, such as R&D and mineral exploration, the spending may fail in its goal, but can nonetheless be treated as an investment. The criterion is that on average the spending has an effect for more than one year.

The Dutch national accounts distinguish 6 different expenditure categories of marketing and advertisement. They are

– Advertisements in newspapers;
– Advertisements in specialist journals;
– Advertisements in other journals;
– Free local papers;
– Advertising pamphlets;
– Other spending on marketing and advertisement.

Free local papers are included since these papers are published with the main goal of advertisement. The other spending on marketing and advertisement includes for instance spending on services from advertising agencies, advertisements on radio and television and advertisements in sporting clubs, pubs and cinemas. For the years 2001 to 2004, this spending is about 13.5 billion euro per year, excluding value added tax. This includes however some double counting and some spending that does not meet our definition of investment. We exclude the following spending.

– Spending by advertising agencies. We assume that all spending by advertising agencies is done on behalf of their customers. Spending on marketing by advertising agencies is therefore considered intermediate input of the advertising agencies. The value of this spending is included in their output, which is already considered (capital) spending by its buyer. Including spending by advertising agencies as (capital) spending would lead to double counting of these costs. It is therefore excluded from the total spending estimates as well as the capital spending estimates.
– Spending by public administration and defence services and by public sewage and refuse disposal services. We assume that their spending is aimed at either recruiting personnel or increasing public awareness about certain issues, and that none is aimed directly at increasing sales. It is therefore excluded from our capital spending estimates.
– Spending on free local papers[9] and advertising pamphlets. We assume these advertisements to be primary aimed at increasing short term output, for example by highlighting special offers. This type of spending is therefore excluded from our capital spending estimates. Whether this exclusion is realistic needs more research. In the future some part of this spending may be capitalised.
– Half of the spending on advertisements in newspapers and specialist journals. We assume half of the advertisements to be employment advertisements. This part is therefore excluded from our capital spending estimates.

Although some of the other spending on marketing and advertisement may also have mainly a short term goal, like advertisement on television, for now we make no correction for this. This leaves us with an investment in brand equity of about 8.5 to 9 billion euro per year, excluding value added tax, for the years 2001 to 2004.

Data on value added tax is only available at a more aggregated level. Some crude estimates were used to determine the value added tax on spending on brand equity. It is estimated at 200 million euro. Capital spending on brand equity, including value added tax, is estimated at 9.2 billion euro in 2004.

The purchase of market research is calculated using the same data as for the estimation of spending on organizational structure. The method is therefore included in the section about organizational structure (2.3.3). Total spending as well as capital spending on market research is estimated at 1.2 billion euro in 2004.

2.3.2 Firm-specific human capital

Although firm specific training primarily improves the human capital of employees, it can be reasonably argued that a company would not pay for it unless it expects a return on

9) Advertisement in free national newspapers (e.g. Metro) is not included in the spending on free local papers but is included in advertisement in newspapers.

investment. Since the expected returns on company training will usually last several years, expenditure on firm specific training meets this criterion of an asset. Also innovations will probably fail without sufficiently skilled employees. For example the creation of knowledge assets will usually not lead to rising profits unless access to complementary human capital is guaranteed. However it is questionable to what extent a firm really exercises ownership rights over the created knowledge embodied in its personnel. A trained employee may choose at any point in time to leave the company for another job. On the other hand, Companies may demand compensation from recently trained employees when leaving shortly after being trained. In this way the benefits of job training are expected to be largely captured by the employer. This may be seen as some sort of ownership. We therefore agree with CHS that expenditure on firm-specific human capital may be seen as capital spending. Following CHS the firm-specific human capital category of intangibles reflects direct firm expenses (outlays on trainers, tuition reimbursement and the like) as well as wage and salary costs of employee time in formal and informal training.

As with R&D, data series with regard to firm-specific human capital are obtained from the Dutch knowledge module. In the context of this knowledge module, five different expenditure categories are estimated:

1. Purchases of 'market' education
2. Travelling expenses and accommodation in connection with education
3. Costs of (internal) teachers/ training personal
4. Material expenses in connection with education
5. Costs of forgone working hours (compensation of employees).

These estimations are mainly based on the 'Continuing Vocational Training Survey' (CVTS).[10] It is held every five years and data are currently available for the years 1993 and 1999.[11]

The following industries are not included in the CVTS:

– Education,
– Public administration and social security,
– Health and social work activities.

For the industry "public administration and social security" the only available source of information on employer provided training expenditure is a survey of education within the central government carried out in 1990. With the help of data on employer-provided training expenditure components from this survey, and growth rates on compensation of employees from 1993 to 1999, as observed among the enterprises in the CVTS, employer-provided training expenditure for this industry is estimated for the year 1999.[12]

For the 'education industry' the only available source of information on employer-provided training expenditure is a survey of continuing education within the education industry carried out in the school year 1994–1995. Again, employer-provided training expenditure for the year 1999 is estimated with the help of data on growth of compensation of employees from 1993 to 1999, as observed among the enterprises in the CVTS.

---

10) This is a survey carried out by Statistics Netherlands under the authority of the statistical office of the European Communities (Eurostat). In the regular national accounts different sources of information are used for different industries to measure purchases of market education and the CVTS is not one of these sources. For the sake of consistency, in the present paper the CVTS is used as the main source of information for the measurement of both purchases of market education as well as other expenditure on (internal) training within enterprises. Therefore, figures on purchases of market education in this paper do not coincide with the corresponding figures in the regular Dutch national accounts.

11) It should be noted that the surveys only include costs of so-called external and internal courses/education, comprising expenditure on courses that are attended by several participants at a time and that are held outside the direct working environment. Expenditure on other forms of training or education like "training on the job", "job rotation" and "attending conferences" is not included. Furthermore, only firms with 10 or more employees are included in the CVTS. This latter omission is partly reduced by adding estimations for firms with 5–9 employees in the estimates for the Netherlands. Underestimation due to the CVTS being the main source of information is discussed in more detail in section 3 and 4.

12) The industry "defence activities" is excluded because it seems not very plausible that employer-provided training expenditure as a percentage of compensation of employees in this industry would be comparable to that within the central government. Therefore no figures on employer-provided training expenditure are estimated for the industry "defence activities".

Finally, for the industry “health and social work activities” no source of information is available. Therefore no figures on employer-provided training expenditure are estimated for this industry.
A more detailed description of the methods used to estimate these firm-specific human capital expenditures, is given by de Haan and van Rooijen-Horsten (2003b).

Currently the knowledge module only supplies data series on employer-provided training expenditure for the years 1995–1999. In order to arrive at a series for 2001–2004 the 1999 data (by industry) were extrapolated using proportions of training expenses to value added (by industry). Better series will become available as soon as the 2005 CVTS data are processed in the knowledgemodule. For 2004, total capital expenditure on firm-specific human capital in the Netherlands is currently estimated at 5.7 billion euro (3.4 billion euro direct firm expenses and 2.3 billion euro wage and salary costs of employee time).

2.3.3 Organizational structure

The organizational structure of a company is often of value to the company. An efficient management system and effective business plans help to minimize waste spending and allow businesses to quickly seize new opportunities, and herewith increasing profits. Spending aimed at improving the organizational structure of a company may therefore be seen as capital spending. It consists of two parts. The first part is the purchase of organizational advice from consultancy firms. The second part is the “own account” creation of organizational structure by the management of the company itself. Since management does not only focus on enhancing the organizational structure of the company, only part of management expenditure should be included as capital spending. At the moment, we have no good estimate of own account investment in organizational structure. Only purchases of consulting services are therefore included in our estimate of investment in organizational structure.

To determine these purchases, first the spending on economic consulting, excluding value added tax, is taken from the national accounts. These purchases are about 8 billion euro a year for the period 2001 to 2004. Spending on economic advice, however, consists of more than improving organizational structure only. To get an estimate of the spending on organizational structure, (micro) data from the four industries that produce mainly economic consultancy services are used. These four industries are
– Market research agencies;
– Organizational consultancy;
– Public relation agencies;
– Other economic research and consultancy.

We consider for these four industries, the output generated with their main activity (i.e. economic consultancy). Spending on market research is considered the purchase of brand equity, and not the purchase of organizational structure. Spending on organizational consultancy is included as investment in organizational structure whereas spending on public relations is not considered spending on intangibles.

The adjustment of the industry “other economic research and consultancy” is the most problematic. It consists of the production of consulting on sales techniques, logistics and product-management, which should be included in the organizational structure. Another part of the industry is management Ltd-s, which usually consist of only a director, and wields the management of another company. Spending on management Ltd-s should be excluded from investment in organizational structure. No data is available about the breakdown of this industry into these parts. We therefore estimate that half of the economic consultancy produced by this industry is an asset.

The share of organizational structure in the output from main activity from these four industries combined is subsequently multiplied by the domestic use of economic advice

from the national accounts to arrive at the total purchase of organizational structure, excluding value added tax. For 2001 to 2004, this equals almost 6 billion euro a year.

Data on value added tax is available on a more aggregated level only. Some crude estimates were used to determine the value added tax on spending on brand equity. It comes to almost 200 million euro. The capital spending on purchased organizational structure, including value added tax, is estimated at 6.1 billion euro in 2004.
In a similar way, in this case however weighing with data from the industry market research agencies, the part of economic consultancy that is considered the purchase of brand equity is estimated at 1.2 billion euro in 2004 (total as well as capital spending).

3. Results and comparison with UK and US

As is clear from table 1, national accounts data series are more often used in the present paper, as compared to the UK and USA studies (MH, 2006 and CHS, 2004 respectively). Table 2 shows the estimates of total spending on intangibles in the Netherlands range from 9.4 to 9.8 % of GDP between 2001 and 2004. For capital spending on intangibles, estimates range between 8.2 and 8.5 per cent of GDP in this period. These figures are lower than those estimated for the UK and the USA in the earlier studies by (MH, 2006) and (CHS, 2004) respectively. As discussed in more detail in section 3.2 however, these differences may also be the result of remaining differences in measurement. In section 3.1 the differences between total spending and capital spending (or investment) estimates are discussed. In section 3.2 results concerning total intangible spending in relation to previously published results for the UK and US are discussed in detail. Section 3.3 provides some results by industry.

3.1 Expenditure and investment

Expenditure is not the same as investment. According to the SNA (SNA-93) expenditure should be treated as an investment when it concerns the acquisition or own account production of an asset. One of the requirements for an asset is that it must lead to benefits for more than one year. Not all spending has that purpose. Therefore not all spending is necessarily capital spending.

CHS and MH assume that 60% of their estimates of total spending on advertising are investments, 80% of own-account organisational structure expenditure and 100% of other types (such as software, R&D and firm-specific human capital). Table 2 shows total intangible spending as well as capital spending estimates for the Netherlands.[13)]
The international discussion concerning the question whether freely available R&D should be capitalised or not is still ongoing. With the aim to exclude freely available R&D, we excluded government consumption of R&D from the estimations of R&D capital expenditure. Excluding government consumption implies that all non-market R&D output, produced by publicly funded R&D institutions (ISIC 73) and universities is excluded from our estimates of R&D capital expenditure. In addition, we excluded some spending categories (e.g. free local papers and advertising pamphlets) from the estimations of capital spending on advertising because we assume that the primary goal of these types of spending is not to increase output over a period of more than one year. This results in total intangible capital spending estimates for the Netherlands ranging between 38.2 and 39.9 billion euro for the years 2001–2004, of which around 12 billion euro is currently included in the Dutch national accounts.[14)] It should be noted that the industry General government is included (except for the R&D government consumption mentioned above)

13) It should be mentioned that total spending is a somewhat misleading notion here since the figures with regard to total spending in table 2 do not (in all instances) represent total expenditure on the different intangibles in the Netherlands. The total spending figures in this table are first estimates (when capital spending could not be estimated directly) after which a discount or correction was made in order to arrive at capital spending estimates. However, in those instances where capital spending could be estimated directly, total spending was set equal to these direct estimates of investment. It is our impression that similar procedures were followed in the UK and USA studies (MH, 2006 and CHS, 2004). As table 2 shows, figures for total spending and capital spending in the Netherlands only differ for R&D and advertising expenditure. In all other instances capital spending could be estimated directly (mainly based on national accounts data series) and total spending was set equal to these direct estimates of investment. This rather arbitrary way of defining total spending (total expenditure on a certain intangible unless capital spending can be estimated directly, in this latter case total spending equals capital spending) complicates international comparisons of figures on total spending. Capital spending may therefore be the more appropriate measure for international comparisons. For future comparisons it may be worthwhile to arrive at a uniform definition of total spending. The most useful definition of total spending is probably 'total domestic expenditure'.

14) Conventionally measured investment in 2004 in the Netherlands is 93 billion euro (Dutch national accounts figures), of which around 12 billion euro is software, mineral exploration, copyright and licence costs and new architectural and engineering designs. It should further be noticed that around 30 billion euro of conventionally measured investment concerns dwellings and around 8 billion euro concerns civil engineering works of the Government sector (2004). If these latter two are excluded, total investment on intangibles as estimated in the present paper approaches traditionally measured (non-intangible) investment.

in these figures. When the industry General government is excluded completely, total capital spending estimates for the Netherlands drop around 4 billion euro (0.8% of GDP). Figures including and excluding General government are discussed in more detail in the next section.

3.2 Results with regard to total intangible spending in relation to UK and US

Based on the estimates presented in table 2, total spending figures are calculated as a percentage of GDP and compared to UK (MH, 2006) and US (CHS, 2004) figures in table 3. The first impression is that the Netherlands overall have lower expenditure on intangibles (9.6% of GDP) than both the UK (10.88% of GDP) and the US (13.13% of GDP). However, since no estimate with regard to own account spending on organizational structure was included for the Netherlands, the corresponding figures for the US and UK should be excluded for the comparison. The bottom line of table 3 shows that total intangible expenditure as a percentage of GDP is rather similar in the three countries when own account organizational structure expenditure is excluded. Indeed the UK and the Netherlands have almost equal estimates. However, when the different types of intangibles are examined in more detail large differences are found. In particular, expenditure on R&D in the financial industry and wage and salary costs of employee time are very low when compared to the UK and US. For both these types of intangibles it is likely that the sources used in the present paper result in an underestimation.

In the case of R&D in the financial industry it was assumed that this is captured by the Dutch R&D survey (see also section 2.2.1). However, based on the figures in table 3 the conclusion must be that it is likely that only part of the R&D in the financial services industries (and possibly also in social sciences and humanities) is actually captured by the Dutch R&D survey. This observation requires further investigation. Part of the explanation may be that most R&D in these industries is not performed on a systematic basis while the definition of R&D on which the R&D survey is based excludes R&D not performed on a systematic basis. Furthermore, MH indicate that the UK R&D survey (which is comparable to the Dutch version since both conform to international standards set out in the Frascati Manual) does not cover financial services very well because financial services are not included in the Annual Business Inquiry, and this inquiry is the main source to determine which firm will be sent an R&D survey form.[15)] Possibly a similar problem exists in the Netherlands.

With regard to firm-specific human capital, it is apparent that the main source, the CVTS, results in underestimations. As pointed out earlier the CVTS excludes expenditure on several forms of training like “training on the job”, “job rotation” and “attending conferences”. Furthermore, only firms with 10 or more employees are included in the CVTS. Although this latter omission is partly reduced by adding estimations for firms with 5–9 employees in the estimates for the Netherlands (knowledge module estimates), expenditure of firms with less than five employees is not included. Marrano and Haskel (2006) compare the UK CVTS (which is comparable since the CVTS is carried out by Eurostat) with two other sources and conclude it results in much smaller numbers (around one third of the estimate based on the National Employer Skills survey that is used for the UK estimates).

It should further be noted that the total intangible spending estimates for the Netherlands include spending by the General government industry whereas the estimates presented for the UK (MH) and US (CHS) represent expenditure of the private (business) sector. As the definition of the private sector may vary from country to country, we chose to present total domestic expenditure figures. In the Netherlands for instance, the General government industry includes almost all education (e.g. all universities), whereas in some

15) R&D survey forms are sent out to firms who answered that they did R&D when asked on the Annual Business Inquiry, with the survey boosted by other firms who are detected as performing R&D by other means (Marrano and Haskel, 2006).

countries private universities are very common. However, since we also estimated intangible spending by industry, the General government industry can easily be excluded. The last column of table 3 presents estimates of total intangible spending in the Netherlands, excluding the General government industry.[16] Assuming that the General government industry is entirely excluded from the US and UK estimates and that the definition of the General government industry is more or less the same in the three countries; this last column is the one that should be compared with the UK and US figures. As shown in table 3, total intangible expenditure as a percentage of GDP drops by around 1.3 percentage point, to 8.3 per cent of GDP, if the General government industry is excluded. However, if total spending figures concerning R&D in the financial industry and firm-specific human capital were to be raised to, for instance, UK-levels, total spending on intangibles (excluding the General government industry) would rise again to 10.6% of GDP. The figures in table 3, excluding the General government industry, could best be seen as lower limit estimates for the Netherlands. In conclusion, as for now the differences between the Netherlands on the one hand and the UK and the US on the other cannot unambiguously be ascribed to true differences. They may also be the result of remaining differences in measurement.

3.3 Results by industry

An advantage of the strong national accounts-based approach to obtaining intangible expenditure estimates is the relative ease by which the estimates can be disaggregated to industry level. In table 4a and 4b total spending and capital spending estimates are shown by industry and main type of intangible. In table 5, total and capital expenditure on intangibles by industry is shown as a percentage of value added. The results shown in table 5 clearly demonstrate the dominance of the industries Manufacturing, and Financial and business activities[17] with regard to capital spending on intangibles. Although to a lesser extent, the industries Transport, storage and communication and Trade, hotels, restaurants and repair also score relatively high on total intangible capital spending.

16) Excluding the industry General government implies that the non-profit part of the R&D industry (ISIC 73) is still included in the total intangible spending figures. In the estimates of intangible capital spending however this non-profit part is excluded too (see also section 2.2.1).

17) It should be noticed that real estate services, including services of owner-occupied dwellings, are included in the estimates for the Financial and business activities industry. Possibly, expenditure on intangibles as a percentage of value added in the Financial and business activities industry would increase if services of owner-occupied dwellings were to be excluded.

4. Conclusions and future work

In this study we have replicated the CHS and MH work for the Netherlands. Our results suggest that investment in intangibles is on average 8.3 % of GDP in the Netherlands in 2001–2004, compared to 9.9 % of US GDP in 1998–2000 and 9.1 % of UK GDP in 2004 (all excluding own account organizational structure expenditures).[18] When the General government industry is completely excluded this percentage falls to 7.5 for the Netherlands. However, results suggest that the estimates for the Netherlands with regard to R&D in the financial industry and firm-specific human capital are too low. If these estimates were to be raised to for instance the UK level, estimated investment in intangibles (excluding the General government industry) in the Netherlands would rise to 9.8% of GDP in the period 2001–2004.

Although these figures should be regarded as tentative and exploratory, it is clear that this method has merit. In particular when national accounts are supported by knowledge or innovation modules, this is the best way to obtain consistent estimates of intangibles. In future work we aim to elaborate further on this work and capitalize a broader range of intangible assets as part of the Dutch knowledge module (this includes the estimation of depreciation patterns). After this we plan to address issues such as: what is the contribution of (extended) intangible capital to output growth?; and how does the inclusion of these intangibles affect the allocation of output growth between capital formation and multifactor productivity growth in the Netherlands? In addition to this, we aim to investigate more conceptual issues such as whether, in the future, all these intangibles should be capitalised in the national accounts?; and, if so, should they be included in the core national accounts or only in satellite accounts?; and what are the consequences of capitalizing these intangibles for the National Accounting system?

18) Total intangible investment is 11.7% of US GDP in 1998–2000 and 10% of UK GDP in 2004. However, since no estimates for own account organizational structure expenditure are included for the Netherlands, the percentages for the US and UK mentioned in the text above are lowered accordingly.

5. References

D. van den Bergen, M. van Rooijen-Horsten, M. de Haan and B.M. Balk, Productivity measurement at Statistics Netherlands, Statistics Netherlands, Voorburg-Heerlen (bpa-no. 204836), 2007.

E. Brynjolfsson, and S. Yang, The Intangible Costs and Benefits of Computer Investments: Evidence from the Financial Markets. Atlanta, Georgia: Proceedings of the International Conference on Information Systems, 1999.

E. Brynjolfsson,k., L.M. Hitt, and S. Yang, Intangible Assets: How the Interaction of Information Technology and Organizational Structure Affects Stock Market Valuations. Cambridge, Mass: MIT Working paper, 2000.

C.A. Corrado, C.R. Hulten and D.E. Sichel, Intangible capital and economic growth. Working paper 11948, National Bureau of Economic Research, Cambridge, January 2006.

C.A. Corrado, C.R. Hulten, and D.E. Sichel, Measuring Capital and Technology: An Expanded Framework. In *Measuring Capital in the New Economy*, C. Corrado, J. Haltiwanger, and D. Sichel, eds., Studies in Income and Wealth, Vol. 65. Chicago: TheUniversity of Chicago Press, 2005.

C.A. Corrado, C.R. Hulten, and D. Sichel, Measuring Capital and Technology: An Expanded Framework. Finance and economics discussion series, divisions of research and statistics and monetary affairs, federal reserve board, Washington, D.C., 2004-65.

Commission of the European Communities, 'European System of Accounts - ESA 1995', Eurostat (Luxemburg), 1996.

Commission of the European Communities, International Monetary Fund, Organisation for Economic Co-operation and Development, United Nations and World Bank, *System of National Accounts 1993*, Series F, No. 2, Rev. 4, United Nations (New York), 1993.

Fukao, Kyoji, Hamagata, Sumio, Miyagawa, Tsutomu and Tonogi, Konomi, Intangible investment in Japan: Measurement and contribution to economic growth. RIETI Discussion Paper Series 07-E-034, 2007.

M. de Haan and M. van Rooijen-Horsten, The national accounts of knowledge-based economies, in: *Measuring the New Economy*, ed. Teun Wolters, Elsevier B.V., The Netherlands, ISBN 0444528040, chapter 4, pp. 63–82, 2007.

M. de Haan and M. van Rooijen-Horsten, *Measuring R&D output and knowledge capital formation in open economies.* Paper prepared for the 28th general conference of the International Association for Research on Income and Wealth, Cork, Ireland, August 22–28, 2004 (discussion paper, CBS internet, nr. 04009).

M. de Haan and M. van Rooijen-Horsten, *The translation of R&D statistics from Frascati to National Accounts guidelines in the Netherlands.* Statistics Netherlands discussion paper, BPA-number 0561-03-MOO, Voorburg, 2003.

M. de Haan and M. van Rooijen-Horsten, *Knowledge Indicators on Satellite Accounts. Final report for NESIS-Work Package 5.3*, Statistics Netherlands, BPA number 2097-03-MOO, Voorburg, 2003b.

M. G. Marrano and J. Haskel, How much does the UK invest in intangible assets? Queen Mary, University of London, November 2006.

E. McGratten, and E.C. Prescott, Is the Stock Market Overvalued? Federal Reserve Bank of Minneapolis Quarterly Review (24:4 Fall): 20–40, 2000.

L. Nakamura, Intangibles: what to put the New in the New economy? Federal Reserve Bank of Philadelphia Business review (July/August): 3–16, 1999.

L. Nakamura, What is the US Gross Investment in Intangibles? (At least) One Trillion Dollars a Year! Federal Reserve Bank of Philadelphia Working paper No 01–15, 2001.

L. Nakamura, The Rise in Gross Investment in Intangible Asset Since 1978. MIMEO, Federal Reserve Bank of Philadelphia, 2003.

OECD, Software task force report OECD, Paris, 2002.

OECD, *Frascati manual 1993*, OECD, Paris, 1993.

OECD, 'Frascati Manual 2002', OECD, Paris, 2002.

M. Tanriseven, M. van Rooijen-Horsten, D. van den Bergen and M. de Haan, Research and Development Statistics. Paper prepared for the Intellectual Capital Congress at the Inholland University of Professional Education, the Netherlands, Haarlem, 3–4 may, 2007

P. van de Ven, Intangibles: invaluable? Should the asset boundary in the 1993 SNA be extended? Paper prepared for the 26th general conference of the International Association for Research on Income and Wealth, Cracow, Poland, August 27– Sept 2, 2000.

http://unstats.un.org/unsd/sna1993/draftingphase/pubChapterDetail.asp?ch=14

Annex

Table 1
Overall classification and methods, US, UK and the Netherlands

	US	UK	Netherlands
Computerized information			
Computer software	Based on NIPA data on three components: own use, purchased, and custom software.	ONS estimates , same method	National accounts
Computerized databases	Own use captured in NIPA software measures. Purchased component estimated from Services Annula Survey (SAS)	Included in our software estimates, see text	Included in our software estimates, see text
Innovative property			
(Scientific) R&D	Mainly R&D in manufacturing, software publishing, and telecom industries. Census on behalf of the National Science Foundation (NSF)	Current expenditure on R&D from BERD. R&D in computer industry subtracted	Current expenditure on R&D, based on R&D survey but translated to R&D use according to national accounting conventions. Estimations of R&D capital expenditure exclude government consumption of R&D. [1)]
Mineral exploration	NIPA	National accounts	National accounts
Other innovative property			
Copyright and license costs	Mainly R&D in mining industries. A) Mineral exploration, Census of Mineral Industries and NIPAs. B) Other geophysical and geological exploration R &D in mining industries, estimated from Census data	National accounts	National accounts
New product development costs in the financial industry	No broad statistical information. Estimated as 20 percent of intermediate purchases by the Financial Services industry	20% of all intermediate purchase by Financial Services industry, ONS data. Intermediate purchases reduced by purchases of adv, software, consulting and design	Assumed to be included in R&D figures based on R&D survey (see above).
New architectural and engineering designs	No broad statistical information. Estimated as half of all US industry purchased services, estimated in turn as half of revenues of the architectural and design industry	Estimated as half of the total turnover of the architecture and design industry SIC 742, ABI data. Turnover reduced by purchases of adv, software, consulting.	National accounts
R&D in social sciences and humanities	No broad statistical information. Estimated as twice industry revenues of social science and humanities R&D industry	No broad statistical information. Estimated as twice industry revenues of social science and humanities R&D industry	Included in R&D figures based on R&D survey (see above).
Economic competencies			
Brand equity			
Advertising expenditure	Grand total by type of advertiser as reported by Universal-McCann	Total spending on advertising as reported by Advertising Association, less expenditure on classified ads	Expenditure, according to National accounts, on marketing and advertisement, excluding spending by advertising agencies. Further exclusions, based on industry and type of advertisement, to arrive at estimates of capital spending.
Market research	Outlays on market research, estimated as twice revenues of the market and consumer research industry as reported in SAS.	Twice revenues of the market and consumer research industry as reported in ABI	Based on National Accounts data series concerning total production and purchases of economic advice as well as more detailed (micro-) data.
Firm specific human capital	Broad surveys of employer-provided training were conducted by the Bureau of Labor Statistics (BLS) in 1994 and 1995. Includes: A) Direct firm expenses (in-house trainers, outside trainers, tuition reimbursement, and outside training funds) B) Wage and salary costs of employee time in formal and informal training.	NESS05, a similar survey of employer provided training, adjusted to consider private sector expenditure and all UK	For most industries based on the Continuing Vocational Training Survey (CVTS) 1999, extrapolated to 2001–2004 using proportions of value added by industry. For missing industries based on other survey's. No estimates for 'Health and social work activities'.
Organizational Structure			
Purchased	No broad statistical information. Estimated using SAS data on the revenues of the management consulting industry.	Data on revenues of managment consulting industry from Management Consulting Association. To obtain the private sector expenditure we applied the private sector/total expenditure of the MCA to the grossed up total of the industry (still provided by the MCA)	Based on National Accounts data series concerning total production and purchases of economic advice as well as more detailed (micro-) data.
Own-account	No broad statistical information. Estimated as 20% of value of executive time using BLS data on employment and wages in executive occupations.	No broad statistical information. Estimated as 20% of value of executive time using ASHE data on wages in executive occupations, excluding software occupations.	No estimates because of lack of data-sources.

[1)] In the current paper the category 'Scientific R&D'is renamed 'R&D'because of reasonbs in the text (see section 23.2.1).

Source: CHS (2004) , MH (2006).

Table 2
Intangibles: Total spending and capital spending in the Netherlands

Type of asset or spending	Total spending estimates				Capital spending estimates			
	2001	2002	2003	2004[1)]	2001	2002	2003	2004[1)]
	billion euro							
1. Computerized information	**6.6**	**6.3**	**6.1**	**6.4**	**6.6**	**6.3**	**6.1**	**6.4**
a) Software and databases: purchased	4.5	4.2	4.1	4.3	4.5	4.2	4.1	4.3
b) Software and databases: own account	2.0	2.1	2.0	2.1	2.0	2.1	2.0	2.1
2. Innovative property	**13.6**	**14.5**	**14.8**	**14.8**	**10.5**	**11.2**	**11.4**	**11.3**
a) R&D, including social sciences and humanities	8.5	8.8	9.2	9.4	5.4	5.6	5.7	6.0
R&D in the financial industry	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.1
b) Mineral exploration and evaluation	0.3	0.3	0.2	0.2	0.3	0.3	0.2	0.2
c) Other innovative property	4.8	5.4	5.5	5.2	4.8	5.4	5.5	5.2
Copyright and license costs	0.2	0.9	0.9	0.7	0.2	0.9	0.9	0.7
New architectural and engineering designs	4.6	4.5	4.5	4.5	4.6	4.5	4.5	4.5
3. Economic competencies	**23.6**	**24.1**	**24.2**	**24.8**	**21.2**	**21.6**	**21.8**	**22.2**
a) Brand equity	12.5	12.7	12.6	13.0	10.1	10.2	10.1	10.4
Advertising expenditure	11.3	11.5	11.3	11.7	8.9	9.0	8.9	9.2
Market research	1.2	1.1	1.3	1.2	1.2	1.1	1.3	1.2
b) Firm-specific human capital	5.2	5.4	5.6	5.7	5.2	5.4	5.6	5.7
Direct firm expenses	3.1	3.2	3.3	3.4	3.1	3.2	3.3	3.4
Wage and salary costs of employee time	2.1	2.2	2.3	2.3	2.1	2.2	2.3	2.3
c) Organizational structure	5.9	6.1	6.1	6.1	5.9	6.1	6.1	6.1
Purchased	5.9	6.1	6.1	6.1	5.9	6.1	6.1	6.1
Own account	–	–	–	–	–	–	–	–
Total intangible (capital) spending	**43.8**	**44.9**	**45.2**	**45.9**	**38.2**	**39.2**	**39.3**	**39.9**
Included in the National accounts					**11.6**	**12.0**	**11.8**	**11.8**
	% of GDP							
Total intangible (capital) spending	**9.8**	**9.7**	**9.5**	**9.4**	**8.5**	**8.4**	**8.2**	**8.2**

[1)] Provisional figures as fas as the Dutch National Accounts are concerned.

Table 3
Spending on intangibles: The Netherlands as compared to the UK and the US

Type of spending	The Netherlands	UK	US	The Netherlands excluding General government industry [1]
	2001–2004[2]	2004	1998–2000	2001–2004
	% of GDP			
1. Computerized information	**1.35**	**1.70**	**1.65**	**1.20**
a) Software and databases: purchased	0.92	0.64		0.82
b) Software and databases: own account	0.44	1.06		0.38
2. Innovative property	**3.07**	**3.23**	**4.57**	**2.44**
a) R&D. including social sciences and humanities	1.91	1.78	2.85	1.52
R&D in the financial industry	0.02	0.69	0.79	0.02
b) Mineral exploration and evaluation	0.06	0.04	0.19	0.06
c) Other innovative property	1.10	1.41	1.54	0.87
Copyright and license costs	0.14	0.21	0.81	0.14
New architectural and engineering designs	0.97	1.20	0.73	0.73
3. Economic competencies	**5.15**	**5.95**	**6.91**	**4.62**
a) Brand equity	2.70	1.59	2.53	2.59
Advertising expenditure	2.45	1.20	2.33	2.34
Market research	0.26	0.39	0.20	0.24
b) Firm-specific human capital	1.17	2.45	1.25	0.81
Direct firm expenses	0.69	1.27	0.24	0.50
Wage and salary costs of employee time	0.47	1.17	1.01	0.31
c) Organizational structure	1.28	1.92	3.13	1.22
Purchased	1.28	0.60	0.87	1.22
Own account	–	1.31	2.26	–
Intangible capital spending	**9.57**	**10.88**	**13.13**	**8.26**
Intangible capital spending excluding own account organizational structure	**9.57**	**9.57**	**10.87**	**8.26**
Intangible capital spending	**8.3**	**10.1**	**11.7**	**7.5**
Intangible capital spending excluding own account organizational structure	**8.3**	**9.1**	**9.9**	**7.5**

[1] The industry general government includes almost all education (including all universities) in the Netherlands.
[2] Provisional figures as fas as the Dutch National Accounts are concerned.

Source: Authors calculations, CHS (2004) and MH (2006).

Table 4a
Intangibles in the Netherlands: Estimates of total spending by industry

	Computerized information				Innovative property				Economic competencies				Total intangible spending			
Industry	2001	2002	2003	2004[1)]	2001	2002	2003	2004[1)]	2001	2002	2003	2004[1)]	2001	2002	2003	2004[1)]
	billion euro															
Agriculture, forestry and fishing	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.2	0.1	0.1	0.1	0.1	0.3	0.3	0.4	0.3
Mining and quarrying	0.1	0.1	0.1	0.1	0.4	0.5	0.4	0.3	0.1	0.1	0.1	0.1	0.5	0.6	0.5	0.5
Manufacturing	1.2	1.1	1.1	1.1	4.1	4.2	4.3	4.4	3.8	3.7	3.7	3.7	9.1	9.0	9.0	9.3
Electricity, gas and water supply	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.4
Construction	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.7	0.7	0.7	0.7	0.9	0.9	0.9	0.9
Trade, hotels, restaurants and repair	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.3	5.2	5.5	5.3	5.5	6.1	6.4	6.2	6.4
Transport, storage and communication	0.8	0.8	0.8	0.8	0.3	0.3	0.3	0.3	1.7	1.8	1.8	1.8	2.9	2.9	2.8	2.9
Financial and business activities	2.7	2.6	2.5	2.6	4.9	5.4	5.6	5.4	8.9	8.7	8.8	9.1	16.5	16.7	16.9	17.2
General Government	0.7	0.8	0.7	0.7	2.8	2.9	3.0	3.0	2.2	2.5	2.6	2.7	5.7	6.2	6.4	6.4
Care and other service activities	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5	0.8	0.9	1.0	1.0	1.5	1.6	1.8	1.8
Total intangible spending	6.6	6.3	6.1	6.4	13.6	14.5	14.8	14.8	23.6	24.1	24.2	24.8	43.8	44.9	45.2	45.9
	% of GDP															
Total intangible spending	1.5	1.4	1.3	1.3	3.0	3.1	3.1	3.0	5.3	5.2	5.1	5.1	9.8	9.7	9.5	9.4

[1)] Provisional figures as fas as the Dutch National Accounts are concerned.

Table 4b
Intangibles in the Netherlands: Estimates of capital spending by industry

	Computerized information				Innovative property				Economic competencies				Total intangible capital			
Industry	2001	2002	2003	2004[1)]	2001	2002	2003	2004[1)]	2001	2002	2003	2004[1)]	2001	2002	2003	2004[1)]
	billion euro															
Agriculture, forestry and fishing	0.0	0.0	0.0	0.0	0.2	0.2	0.3	0.2	0.1	0.1	0.1	0.1	0.3	0.3	0.4	0.3
Mining and quarrying	0.1	0.1	0.1	0.1	0.4	0.5	0.4	0.3	0.1	0.1	0.1	0.1	0.5	0.6	0.5	0.5
Manufacturing	1.2	1.1	1.1	1.1	4.1	4.2	4.3	4.4	3.3	3.3	3.2	3.2	8.6	8.6	8.6	8.8
Electricity, gas and water supply	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.3	0.3	0.3	0.3
Construction	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.7	0.7	0.7	0.7	0.8	0.9	0.9	0.9
Trade, hotels, restaurants and repair	0.6	0.5	0.5	0.5	0.4	0.4	0.4	0.3	4.4	4.7	4.6	4.7	5.3	5.6	5.5	5.6
Transport, storage and communication	0.8	0.8	0.8	0.8	0.3	0.3	0.3	0.3	1.6	1.6	1.6	1.6	2.7	2.7	2.7	2.7
Financial and business activities	2.7	2.6	2.5	2.6	3.5	4.0	4.0	3.9	8.4	8.3	8.4	8.6	14.6	14.8	14.9	15.2
General Government	0.7	0.8	0.7	0.7	1.0	1.1	1.2	1.1	1.9	2.1	2.2	2.2	3.6	4.0	4.1	4.0
Care and other service activities	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5	0.7	0.8	0.9	0.8	1.4	1.5	1.6	1.6
Total intangible capital spending	6.6	6.3	6.1	6.4	10.5	11.2	11.4	11.3	21.2	21.6	21.8	22.2	38.2	39.2	39.3	39.9
	% of GDP															
Total intangible capital spending	1.5	1.4	1.3	1.3	2.3	2.4	2.4	2.3	4.7	4.7	4.6	4.5	8.5	8.4	8.2	8.2

[1)] Provisional figures as fas as the Dutch National Accounts are concerned.

Table 5
Intangibles in the Netherlands: Estimates of total spending and capital spending by industry

	Total intangible spending				Total intangible capital spending			
Industry	2001	2002	2003	2004[1)]	2001	2002	2003	2004[1)]
	% of value added							
Agriculture, forestry and fishing	2.8	3.6	3.9	3.8	2.7	3.5	3.8	3.7
Mining and quarrying	4.5	5.8	4.6	4.2	4.4	5.8	4.6	4.2
Manufacturing	14.3	14.0	13.7	13.5	13.6	13.3	13.0	12.9
Electricity, gas and water supply	4.2	3.3	3.5	3.6	4.1	3.2	3.5	3.5
Construction	3.9	3.8	3.8	3.8	3.7	3.6	3.6	3.6
Trade, hotels, restaurants and repair	9.8	9.7	9.5	9.7	8.5	8.5	8.4	8.5
Transport, storage and communication	10.7	10.0	9.5	9.4	10.1	9.4	9.0	8.9
Financial and business activities	14.6	14.6	14.5	14.2	12.9	13.0	12.7	12.5
General Government	12.8	13.0	12.8	12.4	8.1	8.3	8.2	7.8
Care and other service activities	3.4	3.1	3.3	3.1	3.2	2.9	3.0	2.9

[1)]Provisional figures as fas as the Dutch National Accounts are concerned.