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Measuring Intangible capital: an application to the French data[*] First draft[‡]

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Abstract

Following Corrado, Hulten and Sichel (2005) this paper investigates French spending in "intangible capital". In this work, we tackle two issues. First, working on national accounting data we sharply investigate the data at the source, using detailed supply & use tables. Second, referring to different fields in the economic literature, we deepen the analysis and the measurement methods that have been used recently in the empirical literature. We are then able to assess more accurately the items of interest. We estimate that French intangible GFCF could be valued 6.6% to 7.9% of GDP in 2004.

1 Introduction

A large debate has emerged since the late 1990's concerning the ability for national accounts and economists to properly evaluate factor productivity and growth in a traditional Solow framework. Indeed, numbers of industries have experienced negative trends in productivity since the mid 1980's whereas, information and computer technology have increasingly taken part in production processes, inducing potential gains in productivity.

A recent stream of literature addresses the debate, emphasising the importance of properly assessing production factors, especially capital. Corrado, Hulten & Sichel (2005)[6] bring together the study of source-of-growth accounting model and statistical concerns focusing on the proper evaluation of intangible capital. Referring two the authors, one of the explanation of the decrease in

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productivity growth in developed economies comes from the under-estimation of intangible assets. Thus, they propose a number of intangible expenses that could be accounted for as capital just as fixed capital. This work is not straightforward since some of these expenses are not measured directly. However this work is not totally from scratch since a number of intangibles have already been included in national accounting standards, such as software or mineral exploration. These concerns over intangibles are also increasingly shared with national and international accounting institutions such as the US BEA, the United Nation, the OECD or EUROSTAT. Corrado *et al.* (2005)[6] find that intangible could amount has much as 12% of US GDP and 100% of tangible assets during the 1998-2000 period.

The Corrado *et al.* (2005)[6] paper has engendered a number of research at national and international levels using the same framework. Giorgio-Marano, Haskel & Wallis (2007)[10], Fukao, Hamagata, Miyagawa & Tonogi (2007)[8], Rooijten-Horsten, Bergen & Tanriseven (2008)[17] implement the same framework respectively for the UK, Japan and the Netherlands. Hao et al. (2008)[11] lead a comparative analysis over Germany, France, Spain, Italy, the UK and the US.

This paper addresses the debate empirically. We intend to properly assess French intangible capital relying on Corrado *et al.* framework. Our contribution to the literature is twofold. First, we present a comprehensive work serving as support for clarifying the definition and measuring methods of some items that have received little attention to date. We rely on specific fields of the economic literature in order to get clear of definition, concepts and measurement issues before implementing the estimation work. Second, we use data from the French National Accounts at a very detailed level in order to assess precisely each intangible item. Data are taken from the French input-output tables and supply and use tables at the G level in the French product nomenclature (NES), detailing 116 branches, and at the H level, detailing 700 products. Items not directly covered by these two sources are estimated using a labour-cost based approach relying on quarterly household surveys. Using the methods and the data presented in the following sections, we find that intangible capital could have amounted 110 to 130 billion Euros (6.6% to 7.9% of GDP) in 2004.

The paper is organised as follows. Section 2 presents concepts and definitions of each intangible item. Section 3 presents measurement methods and estimations Section 4 concludes and investigates the work to be done in the future.

2 Identifying assets

Determining which intangibles should be considered as capital is not straightforward. Several characteristics are to be met by these expenses for them to enter the GFCF account. Amongst these characteristics, the main two features are

the lifespan of the asset and its ability to yield returns after one year in service. Although some spending are already easily associated to capital formation, such as R&D or software, some others are not clearly identified as investment. The research in the field relies on both institutional regulation and academic literature in order to draw up a list of accountable intangible investment. Here, we present a short review of the different items that are already recorded as capital in the French national accounts and those that could enter GFCF in the future.

2.1 Items already recorded in the capital account

International institutions have already established conventions for the recording of intangibles in national accounting. The United Nations through the System of National Accounts (SNA) 1993 and the European Commission through the European System of Accounts (ESA) 1995 proposed a number of expenses that should no longer be considered as intermediate consumption, rather as capital.

Although the SNA has no obligatory power on national accounting, its recommendations provide a guideline on how national accounts should be built and to a certain extent on the concepts and methods used to achieve this goal. The SNA93 includes the following items in the capital account:

- Mineral exploration
- Computer software and databases
- Entertainment, literary or artistic originals

These expenses are considered to be assets due to their lifespan. Indeed, their impact on production are supposed to last longer than a year, as fixed assets do.

The European Commission through the ESA95, sets rules of national accounting for European member states. As a result, all recommendations in ESA95 should be applied within member states. The ESA is based on SNA and thus, includes the same items in the intangible assets accounts.

Mineral exploration is considered as fixed assets as "it is undertaken in order to discover new deposits of minerals or fuel that may be exploited commercially" (SNA93). The use of new deposits will eventually be used in production for more than one year and can thus be considered as fixed capital. Moreover, once a firm has discovered new deposits, it is allowed to exploit it monopolistically.

Computer software and databases, either purchased or internally produced, are expected to be used for more than one year and can be capitalised. The OECD 2008 taskforce on "capital measures of intellectual property products" deepens the definition of software assets. As an example, the capital account must include software purchased for more than one year but also software with

annual licenses acquired through a multi-year contract. Onw-account software must exclude software to be sold, copies and embedded software.

The "Entertainment, literary or artistic originals" item is closely analysed by the OECD taskforce based on SNA93 and the 2003 EU taskforce on GFCF, capital stock and consumption of fixed capital. In order for an original to be included in the capital, it must have two particular characteristics:

- Being covered by copyright
- Have primary artistic intent

Besides, the expenses must be intended to be used for more than one year as any fixed asset. Referring to the different sources cited above, this item should include the following expenses :

- Films (including scripts)
- Television and radio programmes (excluding news, TV games and sport programmes)
- Literary works (including books and audio books)
- Musical works
- Painting, sculpture, antiques fine art and jewelry (only if they are originals)
- Photographs and images (if valuable and marketable)

Both the UN and the EU Commission provide short recommendations on the measurement methods to be used when recording these expenses in the capital account. The 2008 OECD task force provides a more accurate guideline for national accountants on both the definition of these intangibles and the methods to be used in recording them. The general method proposed is the following. If the good is acquired on the market, it is valued at the purchaser's price. If it is produced internally, it should be valued on a production cost basis. When measuring production costs, not only employment costs must be included but also non-employment costs, such as equipment purchased and employees training in order to adapt to new tasks associated to intangible production.

2.2 Unrecorded items

Beside these items already defined in institutional reference guides and manuals, other expenses that meet the asset criteria are proposed to be included in the capital account. Nakamura (2001) and Corrado, Hulten and Sichel in their 2005 paper investigate the spending in intangibles in the US and their effect on economic growth. They include different types of spending in their analysis such as the four items presented above but they also propose a list of other intangibles

that should be accounted for as GFCF given their similarities with fixed assets. These two papers have spawned a number of empirical investigations in Europe, focusing on the effect of intangibles on growth.

2.2.1 Research and development

The most striking case of intangible capital is research and development activity. Measuring R&D in modern economies is a crucial matter for multiple reasons.

Innovation and R&D lead to the creation of new products, often protected by copyrights which confer their holder the right to exploit the patent monopolistically and set prices above equilibrium. Another possible outcome of R&D are gains in productivity if the research activity focuses on physical production processes. Finally, those gains are likely to produce spillover within or across industries. All these characteristics imply that R&D has drawn a particular attention from institutions when it comes to measuring it and its effect on firms and on the whole economy. Although, R&D was not in the list of intangible capital in the previous SNA volumes, the forthcoming 2008 version of SNA states that "R&D should be recognised as capital formation" (art. 10.104). This new version of SNA does not propose any particular method in valuing R&D except that it should "be valued at the sum of costs, including the costs of unsuccessful R&D" (art. 10.103). Instead the manual refers to "specific guidelines [...], handbooks on methodology and practices" that "will provide a useful way of working towards solutions that give the appropriate level of confidence in the resulting measures" (art. 10.104). Amongst these reference guides, the Frascati manual published by the OECD since 1963 offers a very detailed guideline for institutions implementing R&D surveys and evaluations in a national accounting aim.

Measurement standards are not fully comparable between Europe and the US. One example for these differences is the definition of the coverage of R&D activities. Whereas US accounting only measure "scientific R&D", European standards also include non-scientific R&D, that is research in humanities and social science.

Whereas R&D has drawn a particular attention from national statistic institutions, other types of innovations have been less scrutinised. Although more difficult to measure, the following items represent large expenses from the private sector. Corrado *et al.* (2005)[6] include items related to innovation such as financial innovation, architectural and engineering design, and non-scientific R&D.

2.2.2 Architecture and engineering design

Architecture and engineering design does not appear in any accounting manual as capital. However certain characteristics could make it similar to investment. Spending in new design for a any given product, being an apartment or an MP3 player, will be used for a period of time that can be longer than one year. In

such case, the exploiting firm is likely to benefit from original designs, especially since design can be protected by patents.

2.2.3 Financial innovation

The case of financial innovation is less clear-cut and has hardly been discussed in the economic and financial literature. The first issue concerning innovations in the financial industry is the definition of such innovations. Three types of innovations can be attributable to the financial industry. First, a significant innovation are the means of payment, such as coins or credit cards. These allow for smoother and faster transactions. As a result, introducing means of transaction increases activity and growth in the whole economy. Second, business processes, or the functioning of financial firms, are also assimilated to innovation. Some of these changes in processes are to some extent imposed by legal innovations. The recent set-up of Basle II regulations led banks to implement new control systems within the firm. These changes in organisation are likely to improve both security in banking activity and productivity through process rationalising. Third, and this as probably the most important in terms of size and concept, Corrado *et al.* (2005)[6] assimilate the creation of financial products as financial innovation. This raises two questions whose answers should help us measuring properly this item.

The first question concerns the definition of new financial products, because only "new" innovations should be accounted for. The second question is about the real positive effects of financial product creation on the economy. In the process of financial innovation it appears that totally new innovation is not likely to happen (Tufano (2002)[16]). Indeed, most financial products are just adaptations of older products. It is then difficult to account for new products only. However these products can still be considered as innovation in the sense that they will replace previous look-alike products. In the market point of view, financial products are created in order to compensate for market imperfection and smooth transactions. They should then, as a means of payment, facilitate transactions and resource allocation at a lower cost. At the macro level, the effect should be positive. In the firm point of view, creating new products, like innovation in other fields, will give a competitive advantage to the innovator compared to its competitors. However, in the case of the financial industry, firms creating new products may not want to protect them with patents for multiple reasons we will detail in the next section. At the micro level, financial innovations may also increase either productivity or monopoly power.

Despite the effective positive impact of financial innovations throughout the 1980's and 1990's, the recent downturn in the global economy following the collapse of banking and financial companies raised questions about the real benefits of financial innovations. Dynan, Elmendorf & Sichel (2005)[7] try to highlight the role of financial innovation in smoothing consumption, housing loans and fixed investment. Particularly, financial innovation would have had a greater

impact than monetary and fiscal policy. A particular attention is devoted to the benefits brought by securitised mortgaged loans. The recent collapse of the housing credit market has forced to reset conclusions on the benefits of such products. Having a closer look at the effect of financial innovations (especially the housing credit) Elmendorf (2008) admits those innovations may increase volatility in the economy. As the access to credit becomes easier, expectations (rational or not) on house prices have a greater effect on both house construction and general spending, increasing the risks and pace of asset price bubbles creation. Another analysis made by Poole (2008)[14] is that, financial innovation does allow for better macro performance, despite some undesirable effects. In his analysis, regulation is really at stake because it is the only means to pursue financial instruments development.

2.2.4 Advertising and market research

Advertising is a delicate issue given the large amounts spent in communication by firms. Corrado *et al.* (2005)[6] estimated that annual investment in advertising equaled 2.33% of GDP between 1998 and 2000, even more than R&D expenses for the same years. This raises two questions. First, are all advertising expenditures capitalisable? Second, how do we properly assess investment in advertising?

There are three reasons for firms to advertise. First is increasing (or at least maintaining) market shares. By doing this, firms increase their output capacity. This can be materialised into temporary promotions for instance. Second is launching new products. Communicate on new product is not only a means to increase sales, it is the final part of the whole product development because the product has to be presented to consumers. This type of communication is embedded into TV and newspapers advertising or press relation. Third is brand-forming. Not only firms need to maintain market shares and inform customers about new products, but they also need to promote their general image. This last objective is maybe the closer to the brand-forming type of investment. This type of communication can be handled through sponsoring, or patronage. The result of brand-forming is not strictly comparable to the one of capital in the sense that is does not increase productivity. Instead, it will introduce product differentiation between goods and create monopoly power for the advertiser. Advertising has then an effect on the price of the good rather than on the production function of the firm.

We can take as an example the MP3 players market and the position of Apple in this market. There is clearly no technical difference between an Ipod and any other MP3/video player. However it benefits from a particular status on the market and can charge higher price due to communication-led differentiation.

It is also worth noting that the first two motives for advertising (market share and product launching) are also indirectly brand-forming though the main objective is of a shorter term one.

2.2.5 Human capital

Training is a driving force in the maintenance of human capital. Human capital can be serviced by firms or individuals depending on who pays the costs and gets the returns to training.

The issue of what kind of training must be included in investments can be addressed through the debate initiated by Gary Becker in 1964 on general versus specific training as it sheds light on what can be shortlisted as cost-effective investments for the firm during the worker's tenure.

According to Gary Becker (1964), when training is general, the individual must bear the cost of it because in a competitive market, he or she is paid according to his/her marginal productivity and the returns are kept by the individual. In contrast, when training is specific to the firm, firms have to finance this investment. Training allows the employee's productivity to increase and the returns to training accrue to the firm. The employee does not receive a higher compensation rate in the secondary labour market.

More recent studies ((Acemoglu and Pischke, 1998 and 1999[2] [1] ; Booth and Zoega, 2000[4] ; Lazear, 2003 [13]; Garloff and Kuckulenz, 2005 [9]) contradict the standard theory as they show firms may have interest in providing general training to their workers and paying for it. Workers may get then lower wages in compensation. Lazear (2003) argues that depending on the thickness of the market, it may not be in the worker's interest to accept a skills-weight that benefits the firm, otherwise he may incur wage losses in the secondary labour market, the more the market is thick.

Corrado et al. (2005) suggest training costs must be totally considered as investment and not intermediates. Specific training enters undoubtedly in this category, as the return to this investment still accrues to the firm after one year. General training when it is offered by the firm on its own training agenda to maintain or enhance the worker's skills may also be considered as such. The firm actually sets the level of skills and prioritises its needs for each category of qualifications. In contrast, institutionalised general training as apprenticeship or alternate classes may be questioned at a micro-economic level but not at a sector level as apprentices or young people on alternate classes are very likely to quit the tutor-firm but stay in the same sector of activity.

In continuing vocational training schemes provided by the firm, some originate on the firms' initiative, others on the workers' one. As long as the returns accrue to firms, the training scheme must be viewed as an investment. Typically, the training plan belongs to this category (table 1).

2.2.6 Organisation capital

Information is an asset to the firm, for it affects the production possibility set and is produced jointly with output. Prescott & Vishner (1980)[15] call this asset "organisation capital". Referring to the authors, there are three ways firms invest in Organisation Capital. First it consists in the knowledge of employees

Table 1: Summary of training schemes (excluding initial institutionalised training

	On workers' or firms' initiative	Return accrue to	Include as investment
Training plan	Firms	Firms	Yes
Individual leave for training	Workers	Workers	No
Individual right for training	Firms	Firms	Yes
Vocational training period	Firms/Workers	Firms/Workers	Yes

ability. Deepening this knowledge should lead to a better *match between employees and occupations*. Second, the firm learns about employees and improves the *match between employees and working in teams*. Third, organisational capital consist in the *human capital* embedded in firms' employees. In the present case, we want to estimate separately, human capital from organisational capital. Improving the match between employees, occupations and work groups eventually increases productivity within the firm. It allows enhanced workers' efficiency and better horizontal and vertical communication.

The communication characteristics is emphasised by Black and Lynch (2005)[3]. The capacity for employees to communicate upwards gives return to management teams on the quality and adequacy of production processes to the firm's objectives. Caroli & Van Reenen (2001)[5] also highlight the role of vertical communication in firms' performance. Based on micro data, they find that increase in performance goes along with improved vertical communication and lower-level initiative as well as with ICT investment.

3 Measuring assets

The French National accounting follows recommendations from SNA93 and ESA95 and includes software, mineral exploration, copyrights and license costs and architecture and engineering design in the GFCF account.

3.1 Computer software

Purchased computer software evaluation

Computer software are produced by NACE 72.1 and NACE 72.2. French National Accounts use information from the Supply and Use Tables (SUT) in order to determine investment in those industries.

In the French NAF product classification, a detailed sub-division of NACE 72.1 allows us to split the total supply into intermediate consumption and GFCF. The French National Accounts include the "Computer software" item

Table 2: Distribution of NACE 72.1 between IC and GFCF

Product (NAF)	Label	Distribution	% in NACE 72.1
72.1Z00 + Z20	Research and consulting in Computing set-up	IC	55
72.1Z11	Engineering in computing systems	GFCF	45
72.1Z12	Hardware turnkey contract	Double-count	0
72.1	Hardware and software consulting (total)	45% GFCF, 55% IC	100

Source: INSEE

in the GFCF account using the following method. First, we measure all intermediate consumption of NACE 72.1 and 72.2. Then, following international recommendations, we distinguish between real intermediate consumption (short lifespan, consumption) and fixed capital formation (longer lifespan, increase in productivity). Table 2 and 3 display the break down of NACE 72.1 NACE 72.2 respectively, and the distribution of their sub-products between IC and GFCF.

Based on EUROSTAT and in line with OECD 2008 recommendations, 72.1Z00 and 72.1Z20 are considered to be intermediate consumption and accounted for 55% of NACE 72.1 in 1999. 72.1Z11 is fully accounted for as GFCF and equaled 45% of NACE 72.1 in 1999. Turnkey contracts are bundled packages made of hardware and software. They are already recorded in other counts, then 72.1Z12 is a double count and is deduced from NACE 72.1. The distribution percentages between IC and GFCF are extended to all years after 1999.

These distributions are based on EUROSTAT evaluation methods and are in line with ESA95 and OECD Task Force 2008 recommendations. Using this method, INSEE estimated that purchased software that should be accounted for as GFCF from NACE 72.1 amounted 4168 million Euros and NACE 72.2 amounted 6794 million Euros in 2000.

Own account software evaluation

Until 2003, the evaluation of own-account software production is based on the employment census "Déclaration Annuelle des Données Sociales" (DADS) and the French population census. Two occupations are retained as computer software producers:

- "Engineers and software technical managers" (PCS 388a, 388b and 388c)
- "Programmers and software technicians" (PCS 478a, 478b and 478c)[1]

[1] PCS (Profession et Catégories Socio-professionnelles) is the French occupation nomen-

Table 3: Distribution of NACE 72.2 between IC and GFCF

Products (NAF)	Label	Distribution	% in NACE 72.2
72.2ZA1 +ZB1	License fee for software packages	GFCF	23
72.2Z1A	Consulting in software development	IC	8.7
72.2Z1B	non-standard software Programming	GFCF	29
72.2Z1C	provision of programmers within turnkey contracts	60%GFCF, 40%IC	14.2
72.2Z1D	Software maintenance	IC	10.7
72.2Z1Z	Other services in software development	IC	10.4
72.2Z20	Conception and development of software support	IC	4.2
72.2	Software consulting and supply	60.6% GFCF 39.4% IC	

Source: INSEE

The occupation classification changed in 2003 and estimations based on employment have been jittering, leading to countercyclical estimations. After 2003, the evaluation of own-account software is based on both the employment census when sufficiently reliable and crosschecked using data from the employers' association, SYNTEC.

Based on a firm-level output database[2], we assume that 23% of ICT employees working in NACE 72 produce own-account software. In other industries, we assume that 85% of ICT-employees produce own-account software[3]. It is also assumed that own-account software producers spend 50% of their time programming, while the other 50% are spent in maintenance, training, etc. The cost of equipment necessary to the production of own-account software, such as machines, is assumed to equal 85% of wage costs. Finally, we multiply the gross wage by 2.08 in order to account for the employer social contributions[4]. These operations are summarised in Table 4.

Using these methods, INSEE recorded 25232 million Euros in software GFCF in 2004. The largest part of this investment has been made by private firms

clature. Occupation used in measuring own-account software production correspond to the ISCO 251 and 252 in the 2008 version. However the two occupation classifications are not directly comparable since ISCO makes a distinction between activities only, whereas PCS also classifies by degree of hierarchy.

[2] Enquête Annuelle d'Entreprises, provided by the INSEE.

[3] One must be very careful avoiding double-counting. We thus exclude software GFCF within the computing industry.

[4] Still, this figure could be revised under next French national accounting benchmark.

Table 4: Summary of own account software estimates in 2004

	ICT employees in NACE 72	ICT employees in other NACE
Share of own account software within total production	23%	85%
Time spent programming	50%	
Cost of equipment	85% of gross wage	
Social contributions	108% of gross wage	
Source: INSEE		

(19466 million Euros), financial firms and public entities accounting for a smaller part (respectively 2610 and 3156 million euros).

3.2 Databases

Although databases could be included in the GFCF account just as computer software[5], no particular attention has been paid to this item in the French National Accounts. Here, we try to estimate investment in databases with intermediate consumption of NACE 72.4, "Database activities" (NAF 72.4Z) as a starting point. The information used comes from the supply and use table of the industry of interest. In 2004, the national accounts recorded a total of 819 million Euros in intermediate consumption of NACE 72.4. Within this total, 41 million were bought for resale, and should then be excluded from our measurement, and 152 million Euros were acquired by public entities. We estimate that 20% of the total purchases were made by firms from the financial industry[6].

We do not distinctly estimate own-account database production as it is already included in the own-account software production item. Indeed, database programmers and managers are part of the PCS 388b and 478b we use to estimate own-account software production. Own-account database production is then recorded in the wrong item. We do not have sufficiently detailed data in computer programming occupations in order to separate software programmers from database programmers.

3.3 Research and development

The research and development account is estimated using French input output tables. The total amount of intermediate consumption of R&D products (NACE 73) was valued 23140 million euros in 2004. This amount includes purchases

[5] SNA93 recommends to include large databases in the GFCF account. ESA95, however, does not include this item in the list of intangible assets. As a result, there is no obligation for European countries to include such spending in the capital account. The 2008 version of SNA extends the measure to all-sized databases.

[6] Financial firms accounted for 20% of total spending in NACE 72 in 2004. We assume that this share is also valid for the sub-category of databases.

by public administration and by the R&D industry. It is recommended not to record intra-industry consumption in order to avoid double-counting. Just as we exclude intra-industry consumption in the software industry, we exclude R&D consumption made by R&D firms assuming that these purchases are included in the production process. Total intermediate consumption excluding NACE 73 amounted 20927 million Euros in 2004.

In order to properly assess spending, we need to integrate production for own final use of R&D by public administrations which was valued at 506 million Euros by INSEE in 2004. This leaves us with a total potential R&D GFCF of 21433 million Euros in 2004 (rows C+D+E in Table 5).

Table 5: Summary of R&D GFCF estimates in 2004

		Million Euros
Total IC of NACE73	A	23140
Intra-industry cons.	B	2213
Market sector	C	19426
Pub. administration	D	1501
Prod. for own final use by pub.admin.	E	506
Basic research	F	1081
Applied research	G	8840
Experimental development	H	11512
R&D GFCF 1= F+G+H		21433
R&D GFCF 2= F+G+(1/2*H)		15677
R&D GFCF 3= F+G+(1/3*H)		13759

Source: INSEE

In the Frascati Manual, R&D activities are divided into three types of research: basic research, applied research and experimental development. Both basic and applied research can be fully accounted for as GFCF. Besides, it may be more accurate not to account experimental development as GFCF. Indeed, the frontier between experimental development and pre-production development is somehow blurred. The former should be included in the capital account while the latter should not. It is probable that firms do not make a clear distinction between these two different steps and that figures on experimental development also include pre-production costs. In Table 5 we summarise the calculation made to measure R&D capital including assumption on the share of experimental development that should be accounted for. Under the first assumption, we estimate R&D GFCF as the sum of basic research, applied research and experimental development. Under the second assumption, we include half of experimental development spending. Under the third assumption we include only one third of experimental development. Using these estimation methods, and under different

scenarios, R&D GFCF could range between 13759 and 21433 million Euros.

3.4 Copyrights and license costs

International accounting rules covering the recording of copyrights in the national accounts already exist. Those rules supply a guideline on what expenses should be included in the GFCF account. As recommended in the 1993 SNA (annex 1 68.) and directed by the 1995 ESA (annex 7.1 AN.1123), the copyright and license costs have to be accounted for as GFCF:

68.: "The 1993 SNA includes in output literary or artistic works (i.e., the writing of books, composing music, etc.) which are produced for sale whether they are produced by employees or by self-employed workers. Furthermore, it recognizes that these outputs can contribute to production in subsequent periods and, therefore, treats expenditures on these outputs as gross fixed capital formation resulting in the creation of an intangible fixed asset (AN.1123). Consequently, fees, commissions, royalties, etc. stemming from licensing others to make use of the works are treated as payments for services rendered. Accordingly, copyrights no longer appear as non-financial non-produced intangible assets giving rise to property income, as they did in the 1968 SNA."

Although SNA and ESA widely define the scope of the GFCF account, no particular precision on specific spending nor estimation method is proposed. The OECD Task Force on "Capital measures of intellectual property products" adds some precision to the measure of copyright and license costs as GFCF. Table 6 exhibits the activities recorded as GFCF by the INSEE (column (B)) and the recommendations made by the OECD (whether the national account should include or exclude the item from GFCF). The task-force also recommends excluding TV games and sport shows from GFCF due to their short lifetime. However, broadcasters may buy sport or games licenses that last more than one year.

The OECD task-force adds four conditions under which the expense can be considered as investment (536.):

- "The item must be covered by copyright"
- "The work should have a primary artistic intent. This means that the original should be produced with the original itself as the end product, not as an interim part of the production process of another product or asset."
- "The item must satisfy the capitalisation criteria, as for any capital item to be included as GFCF. That is the ESA95 requirement that a capital asset must be intended to be used in the process of production repeatedly or continuously for more than one year."

- "The item is not covered elsewhere in the national accounts. If the item satisfies the criteria above and is not capitalised elsewhere in the accounts then the item should be included as an entertainment, literary or artistic original. Items which would be excluded here include software originals and valuables."

The amount recorded as GFCF is the amount of production for own final use by the NACE activities presented in Table 6. Following this method, INSEE recorded 2538 million Euros in motion picture, radio, literary and sound recording GFCF (0.15% of GDP) in 2004.

Table 6: Composition of Copyright and licence cost item in French NA

NACE rev.1	Label	OECD recommendations
9211	Motion picture and video production	Include
9212	Motion picture and video distribution	Include
9213	motion picture projection	Include
9220	Radio and television activity	Partial (exclude games, sports)
9231	Artistic and literary creation and interpretation	Include
9232	Operation of art facilities	Include
9251	Library and archives activities	Include

Source: INSEE, OECD

3.5 Architecture and engineering design

Although there is no explicit obligation from ESA95 nor recommendations from SNA93 to record any "Architecture" activity as investment, ESA95 ask for the inclusion of "other intangible fixed assets" defined as "new information, specialised knowledge, etc., not elsewhere classified, whose use in production is restricted to the units that have established ownership rights over them or to other units licensed by the latter" (AN.1129). As a result, architectural and engineering design is included in GFCF. Besides, ESA95 states that "Mineral exploration and evaluation" (included in NACE 74.2 or NAF 74.2C in the French nomenclature) must be included in GFCF.

The item "Architecture and engineering design" is thus accounted for as GFCF in the French national accounts. The GFCF account is based on Supply and Use Table of the following products:

- "Architecture activity" (NACE 74.2) (NAF 74.2A & 74.2B)
- "Engineering" (NACE 74.2) (NAF 74.2C)[7].

[7] This includes mineral exploration and evaluation.

The French product classification is more detailed than the international one. This allows us to accurately assess supply and uses for sub-activities within architecture. The entire NAF 74.2A and NAF 74.2B are included in the GFCF account. Only a share of NAF 74.2C is retained as GFCF. The GFCF part of "Engineering" excludes "sales of equipment" and "turnkey contracts". All purchases from the construction industry (NACE 45.1, 45.2, 45.3, 45.4) are excluded from the GFCF account. Indeed as these expenses are likely to be bundled with other products (the building itself), they are then recorded as IC. NAF 74.2C also includes mineral exploration GFCF.

In 2004, INSEE recorded a total 15684 million euros of architecture GFCF including:

- 12227 million euros by non-financial firms
- 2253 million Euros by households
- 72 million Euros by financial firms
- 1132 million Euros by public entities

3.6 Advertising and market research

Purchased advertising and market research

Advertising and market research expenses are still accounted for as intermediate consumption in the French national accounts. However they are recorded as distinct items. We thus can evaluate them precisely.

Advertising is recorded under NACE 74.40 (NAF 74.4A and 74.4B) and market research is recorded under NACE 74.13 (NAF 74.1E). When transferring expenses from intermediate consumption to GFCF, one must be very careful with two particular issues. First is avoiding double-counting. Second is being sure that the expense meets the asset criteria. Avoiding double-counting is crucial when measuring GFCF. Indeed, if one double counts the same amount, GFCF being a component of GDP, the later is mechanically over-valued. Referring to the advertising industry, we can take the following case as an illustration. An announcer launches a communication strategy and entrusts a communication consulting agency with the entire project from conception to diffusion. The agency develops the project and buys advertising space in different media in the behalf of the announcer. In this case the agency includes the price of advertising space in the price paid by the announcer. There are then two monetary flows for the same service. These two flows appear as intermediate consumption but only one must be recorded as GFCF. Thus, we remove intra-industry expenses from our estimations, assuming that they are made on the behalf of the announcer.

As detailed in Section 2.2, valuing intangible GFCF must only include expenses that meet the asset criteria. In the case of advertising, we only account for expenses that should lead to an increase in the brand value. It is not clear whether short-term communication campaigns, such as promotions, have an impact on the value of the brand. In order not to over-value advertising GFCF we only account for "durable" communication. Table 7 presents the type of advertising and their amount and shares in the total advertising.

Table 7: French advertising expenses distribution

	1995	2000	2004	2005	2006
Media:	36.57%	37.56%	34.83%	34.46%	34.61
Press	16,02%	15.74%	14.04%	13.91%	13.86%
TV	11.84%	13.06%	12.81%	12.65%	12.94%
Radio	3.15%	3.04%	3.11%	3.10%	3.08%
Display	5.29%	5.28%	4.53%	4.43%	4.35%
Cinema	0.28%	0.43%	0.33%	0.38%	0.39%
Internet	0%	0.50%	0.57%	1.19%	1.67%
Non-media:	63.42%	62.44%	65.17%	65.54%	65.39%
Promotion	15.73%	15.56%	15.46%	15.51%	15.61%
Direct marketing	30.78%	30.88%	32.21%	31.67%	30.69%
Directories	3.76%	3.01%	3.46%	3.56%	3.66%
Marketing events	7.58%	7.12%	8.10%	8.11%	8.20%
Public relation	5.57%	5.38%	5.36%	5.49%	5.56%
Total	100%	100%	100%	100%	100%

Source: IREP, FrancePub

Within these expenses, assumptions can be made regarding the brand forming capacity of promotion activity. Indeed, promotion is very short-lived and it is not clear whether is contributes to building the brand.

Besides, other expenses are not assimilated to capital formation. This is the case for classified advertising. Following Rooijen-Horsten *et al.* (2008)[17] we can drop classified advertising from the measurement. In France in 2004, 18% of advertising expenses published in the press was classified advertising. Table 8 summarises the evaluation of advertising GFCF in 2004. There are two results we can use depending on the assumption we make concerning the brand-forming capacity of promotion. Estimations range between 18237 million Euros and 15410 million Euros for the market sector, depending on whether we include or exclude promotion from advertising GFCF[8].

Own account advertising, public relation and communication.

We have dealt with the purchased part of advertising but, still, a share of firms' communication is realised internally. The inner advertising produced by

[8] These estimations exclude advertising expenses from the public sector.

Table 8: Summary of purchased advertising GFCF estimates in 2004

	Component in Mn € / percentages	Result
Total advertising and market research IC		27000
minus intra-ind. and public consumption	6643	20547
minus market research IC	1836	18711
minus classified ad.	2.6%	18237
minus promotion	15.5%	15410

Source: INSEE, IREP, FrancePub

non-adverting firms is close to zero. However, communication plans are initiated by the announcers themselves and externalised afterwards. Besides, firms build long-term communication strategies and do handle public relations. As a consequence, it is crucial to account for internal communication production.

As for the own account advertising production evaluation, we use a cost based method in order to estimate the cost of communication realised internally. For that purpose, we refer to a quarterly household survey[9], giving information on occupation, industry of employment and wages, amongst other. The figures are displayed in Table 9. Using these data, we can evaluate the number of employees doing communication in firms outside the advertising industry. The occupations retained for this analysis are the following:

- Advertising managers (PCS 375a)
- Public relation and communication managers (PCS 375b)
- Advertising and communication assistants (PCS 464a)

The estimated monthly wage bill amounts 127.6 million Euros. In order to account for employers' social contributions we multiply the gross wage by 1.5[10]. Relying on these assumptions, own-account communication production during a year could be valued 2298 million Euros. Adding these estimates to the widely defined purchased advertising (including promotion), total advertising capital could amount 20535 million Euros.

Still, this is an estimation using a wide definition of intangible capital, that is, including promotion and work done by assistants. No particular manual provides any recommendation on the way to measure advertising capital. Concerning the cost based estimation, one can raise questions concerning the inclusion of assistants in capital creation. There are two different ways this occupation

[9] Enquête Emploi en Continu.

[10] This assumption is been scrutinised in order to improve estimations' quality

Table 9: Structure of communication employment, excluding advertising industry

	PCS	Occupation	Number	Av. wage in €	Monthly wage bill (Mn €)
Market sector	375a	Advertising managers	9 069	2 660	24.1
	375b	PR and communication managers	20 230	3 454	69.9
	464a	Ad. and communication assistants	25777	1 180	30.4
Non-market sector	464a	Ad. and communication assistants	1143	2854	3.2
		Total	56 219		127.6

Source: INSEE

can be considered. First, assistants have no creative activity and handle mainly technical work. As such, they do not participate to the building of the brand. Second, although they do not create brand value directly, their work implies a cost that must be included in the cost of brand-forming. Using the narrow definition of communication occupation, the own-account communication production amounts 1694 million Euros. In total, advertising investment using the narrowest definitions could be valued 17036 million Euros.

Market research

We also evaluate market research spending using the detailed supply and use tables. With the same estimation method, we estimate spending in market research by the market sector, excluding intra-industry transactions. In 2004, these expenses amounted 1836 million Euros (including 46 million Euros by public entities).

3.7 Financial Innovation

The method used by Corrado *et al.* (2005)[6] consists in proxying financial innovations by a share of the financial industry intermediate inputs. They assume that these innovations could amount as much as 20% of the industry intermediates. With these calculations, they find that financial innovations equaled 75 billion $ (0.58% of GDP) between 1998 and 2000 in the US. This method has also been used in other papers. Hao *et al.* (2008)[11] make the same calculation for their assessment of French and German intangible capital. This method, however, is not fully satisfying as claimed by the original authors. Indeed, this proxy lacks sound foundations and needs to be improved.

Until very recently, the issue of measuring financial innovation has received little attention. However, Hunt (2008)[12] proposes two evaluation methods.

One way to measure financial innovation would be to refer to national R&D surveys. As these surveys usually apply to all industries, including financial services, valuable information could be used from these sources. In the US the National Science Foundation (NSF thereafter) is in charge of the R&D survey. In 2005, R&D spending for financial industries was 3 billion $, approximately 0.3% of GDP. However, it seems like R&D surveys, that are originally designed for manufacturing firms where R&D activity has its own department (which is not the case in financial firms), do not fit the particular case of financial intermediates. As a result, financial firms do not answer properly to R&D surveys and R&D figures in this industry is largely underestimated. Nevertheless, the gap between NSF results and Corrado *et al.* (2005)[6] estimations are not totally attributable to the low response rate of firms. Their method eventually over estimates real spending.

Another issue that we must account for in our investigation is the large part of "financial R&D" handled by computer and software innovation in the financial industry. Hunt (2008)[12] states that 58% of R&D spending of firms in finance, insurance and real estate was devoted to software.

As figures obtained through the NSF survey are not fully satisfying, Hunt proposes an alternative method to evaluate spending in financial R&D or spending in R&D by financial firms. Referring to NSF results, 80% of financial R&D costs consist in wages He thus proposes to estimate these expenses with a labour cost-based analysis. We follow the same methodology applied to the French data. With this aim in view, we use a quarterly household database[11] informative on occupations, industries, wages amongst other. This method is consistent with the evaluation of other items since part of them are estimated through a cost-based analysis. Table 10 displays the different occupations that are assumed to be *research occupations*, their number in the financial industry, and their average monthly wages.

[11] Enquête Emploi en Continu.

Table 10: Research occupations in the financial industry

Code (PCS)	Occupation	Employees in all industries (units)	Share of fin. indus. within total	Employees in fin. indus	Share in fin. innov. activity	Share in fin. innov, strict definition	Monthly gross wage (Euros)
A	B	C	D	E	F	G	H
372a	Economic, financial and trade research managers	20643	18%	3789	13.92%	30.11%	3555
375a	Advertising managers	20162	0%	0	0%	0%	2353
375b	Public relations and communication managers	20875	0.57%	118	0.43%	0%	3454
376a	Managers in financial markets	3300	93%	3072	11.29%	24.41%	2218
376e	Managers in insurance	41499	79%	5722	21.03%	45.47%	3262
382b	Architects	15582	0%	0	0%	0%	1589
388a	Engineers, software R&D	211100	7%	13808	50.74%	0%	3066
388b	Engineers and executives in computing	8382	0%	0	0%	0%	-
388c	Project manager, ICT managers	1865	36%	663	2.44%	0%	2267
464a	Advertising and PR assistants	34305	0.12%	42	0.15%	0%	1512
	Total	377713	19%	27214	100%	100%	

Source: INSEE

Column (A) and (B) display the codes (in the French PCS classification) and the occupations related to innovation as proposed by Hunt (2008)[12]. Column (C) provides the total number of each occupation in the whole economy. We find that 377713 employees have an innovation-led occupation compared to 3.2 billion in the US. Column (E) and (F) show the number and the distribution of research occupations within the financial industry. We see that the managers in insurance and software engineers category are the most important amongst all presented here. Comparably to the US data, half of research occupations in the financial industry are jobs related to software programming. We already recorded these occupations in the own account software item, it is crucial not to double-count them. We thus exclude software related activities from the financial innovation estimates[12]. We also exclude occupations related to advertising and public relation since we record them in the own account advertising account. Multiplying column (E) by column (H) and summing all occupations gives us the monthly wage bill related to research activities in the financial industry, which amounts 39 million Euros, excluding software programmers and advertising activity. During a whole year and accounting for employers' social contributions (assumed equal to 50% of gross wage), we record 701 million euros in financial innovations using Hunt's method. Again, there is a huge gap between Hao *et al.* (2008)[11] 9.6 billion Euros estimates and our cost based measurement. We think however that this method is more accurate than the one based on intermediate consumption.

3.8 Human capital

Training can be contemplated in two ways in the scope of calculating investment & productivity at the firm or sector level.

First, if a firm-funding approach is assumed, then a firm invests in its employees, and spends some more money to fund the training system through the tax, up to a ceiling of 1.6% of gross wages (after deduction of its own expenses on training). Thus, we have to disregard training that is not tax deductible for a specific firm. Some firms, as the smaller ones benefit from the tax redistributive system as they can receive more training for their employees than they pay for. Then, their productivity (TFP) is increased. Keeping out the tax system could be accounted for by assimilating the tax system to a subsidy for smaller firms.

Second, employees can receive training from their firms but can also be funded by the State and the regions. So, in this approach, employees are affected the total sum corresponding to their training. Investment will then be higher than in the first case and TFP lower. Unless spending by the State and the regions is considered again as a subsidy and then disregarded.

It seems simpler to focus on the firm approach and consider only firms with more than 10 employees and training costs that are tax-deductible. As training is a mandatory fiscal system, firms have to fill tax forms, with their tax

[12] Another question is whether these occupations should be considered as software capital recorded in the software item or should be considered as financial innovations. Still, this conceptual issue shall be pinned up for further debate.

deductible expenses. The continuing vocational training box of the fiscal form includes details on internal and external training expenses, compensation of and special fees for trainees, and funds paid to the tax collecting organisations, in charge of launching training actions for the funding firm and also redistributing the rest to other smaller firms, less subsidies received. It excludes training through job rotation, self-learning and free learning at conferences, lectures and workshops, contrary to the EUROSTAT CVTS survey, which was used by Hao, Manole and Van Ark (2008).

All in all, 26096 millions of euros were spent by the State, the regions, firms and households on training in 2005, that is, 1.51% of GDP. Out of this amount, firms dedicated a total of 40% to training including apprenticeship and alternate classes, and about two thirds of this amount to their employees. This spending stricto sensu is broken down in internal expenses for 12%, purchase of training for 17%, trainees' compensation for 27% and in payments to the tax-collecting institutions for 41%. Payments to tax-collecting institutions amounted to 2353 millions of euros when focused on the main core of the business training scheme, i.e. the training plan, and training expenses performed by these institutions for firms related to this specific means of training accounted for 2203 millions of euros. Then, a substantial amount comes back to firms in the form of training actions (94%).

Hao et al. (2008) pointed out that according to the CVTS 2005, indirect costs including apprenticeship amounted to 0.9% and direct costs to 1.4% of labour costs.

According to our administrative source, indirect costs excluding apprenticeship and alternate classes accounted for 0.78% and direct costs including tax-collecting institutions 2.11% of labour costs. If tax-collecting institutions are excluded, then direct costs amount to 1.25% of labour costs. Including apprenticeship, as firms invest 932 millions of euros in apprenticeship through the OCTA (tax-collecting institutions for apprenticeship), and an extra 929 millions in alternate classes, the overall firm spending on training is 10.5 billions of euros. The breakdown of total expenses for apprentices and alternate classes between indirect and direct costs needs a further investigation.

Table 11: Firms' spending for continuous training

Year	Spending per employee (€)	FPR	Number of trainees	access rate	hours of training per employee	average training length	Spending in (million €)
1995	680	3.26	3410808	34.1	14.36	42.12	6797
1996	691	3.25	3512985	35	13.99	39.97	6933
1997	707	3.24	3369866	35.5	13.49	38.01	6716
1998	729	3.23	3562591	37.7	13.61	36.15	6902
1999	722	3.22	3664499	37.4	12.96	34.71	7085
2000	716	3.16	3645001	36.1	12.66	35.09	7228
2001	735	3.14	3898022	37.5	12.45	33.25	7650
2002	763	3.02	3265967	33.8	10.69	31.68	7384
2003	744	2.88	3497453	35.2	11.03	31.32	7387
2004	803	2.97	3843099	39	11.99	30.72	7906
2005	811	2.89	4162861	40.4	12.3	30.4	8345
2006	817	2.88	4270185	41	12.31	30.2	8548

Source: CEREQ and CEPII's calculations. Note: FPR is the Financial participation rate, that is tax-deductible expenses relative to gross wages of the firms, the access rate is the number of trainees relative to the number of employees

3.9 Organisation Capital

The organisational capital we aim at measuring is made of two distinct items: "purchased" organisation and internally produced organisation. The first component is assimilated to the purchasing of business consulting, which is easily tractable in the national accounts. The second part, however, is much more difficult to assess. We estimate the purchased part of organisation capital with the supply and use table of NACE 74.14 (NAF 74.1G) "Business and management consulting activities". In 2004, the National Accounts recorded a total intermediate consumption of NACE 74.14 of 22168 million Euros, including 726 million Euros as intra-industry consumption (which is excluded from GFCF) 4623 million Euros purchased by public administrations and 16819 million Euros purchased by firms.

For the internal production of software, advertising or financial innovation, we have been relying on labour cost based analyses since occupations linked to these productions were easily identifiable. In the case of organisational capital however, it is not clear which part of firms' staff is involved in the production. As highlighted by Prescott & Visscher (1980)[15], knowledge in employees and staff organisation is handled by human resources departments and managers. Thus, Corrado *et al.* (2005)[6] and Hao et al. (2008)[11] proxy organisational capital with a share of managers compensation. They assume that managers may spend 20% of their time working on improving organisation within the firm[13]. Although this method could be a benchmark for further studies, we think that large errors may appear with such a method. Hao et al. (2008), when comparing France and Germany, find that France spent twice as much in organisation capital than Germany did. They use employment data from the Structure of Earning Survey based on data collected by national institutions and bundled by EUROSTAT. Large differences appear between the two countries. Considering ISCO group 1 as the managing staff, they find that Germany counts 486006 managers whereas France would count as much as 909806 employees in the same category. This gap leads to incomparable results between the two countries. Moreover, it is probable that such problem of comparability also happen for other countries. Exploring employment data at a more detailed level than the 9 ISCO groups could improve quality and comparability of estimations. We thus face two important issues. First we are still not sure about the accurate way to measure internal production of organisation capital, although we could use CHS method. But, second, we see that we lack comparable data to implement such work at the European level using the most aggregate level of the international occupation nomenclature. Further work, jointly implemented with

[13] CHS also make estimations with one third of managers time spent on improving organisation. Indeed, the result is very sensitive to these ad-hoc hypothesis and might seem overvalued given the amounts associated to such estimation methods. However, Edward Prescott in his comments states that these figures may still be underestimating the real potential organisation capital. Based on his work, organisation capital is built by managers but also by lower-level staff once they have been affected to the correct task and that there are no bareers to communication within the firm.

other research teams in the field could lead to a consensus on precise occupations that could be considered as organisation-building.

4 Conclusion

In this paper we intend to evaluate French intangible investment following Corrado, Hulten & Sichel (2005)[6] propositions. To date, only few intangibles are recorded as GFCF by national accounts, yet some of these expenses are comparable to capital in two ways. First, they can increase productivity just as tangible capital. Second, their lifespan is greater than one year. For these reason it seems more accurate to consider these intangibles as capital rather than expenses. Although we follow CHS approach, we try to improve their analysis in two ways. First, we rely on very detailed French national accounting data provided by the INSEE, the French office of national statistics. These data allow us to present accurate and homogenous figures. Second, we go deeper into the concepts, the definition and the estimation methods of several items relying on the literature of specialised economic fields.

Some of the items proposed by CHS are already recorded as capital in the French national accounts. This is the case for software, mineral exploration, literary and artistic originals and architecture and engineering design. We take these figures just as they are presented by the INSEE. Some other items are not recorded as capital but distinctly recorded as intermediate consumption, such as purchased advertising, R&D or databases. We use supply and use tables as well as input-output tables in order to distinguish between the "real" intermediate consumption part of these items and the part that could be considered as GFCF due to its characteristics. Finally, some items such as, financial innovation, own account advertising or human capital, are not recorded anywhere. For this category we rely on alternative sources, like employment data, tax bills or surveys. For each item, we define the asset characteristics and motivate our choices in terms of estimation method. For certain items however, we cannot conclude on a unique definition and estimate. We thus propose an estimation range. We find that France could have invested between 110 and 131 billion Euros (6.6% and 7.9% of GDP) in intangibles in 2004. If we restrict to the market sector only, estimations range between 96 and 116 billion Euros (5.8% and 7% of GDP).

Through the large work of investigation that has been implemented not only in terms of data exploration but also in terms of concepts and methods refining, we have started to deepen the understanding and estimation processes of items such as human capital or financial innovation and implemented methods that had never been handled in Europe previously. We thus hope to provide a significant improvement to CHS benchmark.

This work will eventually pave the way for further studies. First, time series analyses will provide a dynamic view of intangibles in the French economy and be followed by a growth accounting work aiming at measuring the contribution of intangible capital to GDP. Second, the present paper is based on aggregate data,

further work relying on micro data, surveys or interviews will help improving both definitions and measurement of intangibles.

A Summary of intangibles evaluation

Table A.1 summarises French intangible accountable GFCF in 2004. When possible, we present disagregated spending by sector (non-financial market sector, financial fims, non-market sector and households) so that we can, at least provide detailed results for both the whole economy and the market sector only.

For items that are subject to conceptual issues, we provide figures depending on the definition width. We have figured out that items such as R&D or advertising could have wide or narrow definition. Table A.1 displays this different results. Using either narrow or wide items definitions, intangible GFCF could amount between 6.59% and 7.85% of GDP in 2004.

Table A.1: Summarised results

	Definition width	Total Mn €	%GDP	Sectoral breakdown	Mn Euros	% GDP
Computer software		25232	1.52%	Non-financial market sector	19466	1.17%
				Financial market sector	2610	0.16%
				Non-market sector	3156	0.19%
Database		778	0.05%	Market sector	626	0.04%
				Non-market sector	152	0.01%
R&D	Wide def.	21433	1.29%	Market sector	19426	1.17%
				Non-market sector	2007	0.12%
	Narrow def.	13759	0.83%	Market sector	12470	0.75%
				Non-market sector	1288	0.08%
Copyright and licence costs		2538	0.15%		2538	0.15%
Architecture and eng. design		15684	0.95%	Non-financial market sector	12227	0.74%
				Financial market sector	72	0.00%
				Non-market sector	1132	0.07%
				Households	2253	0.14%
Advertising	Wide def.	20535	1.24%	Market sector	20019	1.21%
				Non-market sector	517	0.03%
	Narrow def.	17036	1.02%	Market sector	16651	1.00%
				Non-market sector	385	0.02%
Market research		1836	0.11%	Market sector	1790	0.11%
				Non-market sector	46	0.00%
Financial innovation		701	0.04%		701	0.04%
Human capital	Wide def.	20119	1.21%		20119	1.21%
	Narrow def.	9976	0.60%		9976	0.60%
Organisation capital		21442	1.29%	Market sector	16819	1.01%
				Non-market sector	4623	0.28%
Total - All sectors	Narrow def.				109362	6.59%
	Wide def.				130294	7.85%
Total - Market sector	Narrow def.				95941	5.78%
	Wide def.				115707	6.97%

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