

Measuring Intangible Investment

Towards an Interim Statistical Framework: Selecting the Core Components of Intangible Investment

by

Alison Young

OECD Secretariat

© OECD 1998

ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT

TABLE OF CONTENTS

TOWARDS AN INTERIM STATISTICAL FRAMEWORK: SELECTING THE CORE COMPONENTS OF INTANGIBLE INVESTMENT	3
1. Introduction.....	3
2. An initial list of intangible investment components	3
3. Criteria for selecting “core components”	5
4. Some investment terminology	5
4.1 Need for the test	5
4.2 The example of tangible investment	5
4.3 Basic tenets applied to intangibles.	7
4.4 Relationship between tangible and intangible investment and between intangibles	10
5. Treatment of possible components of intangible investment in the system of National Accounts	11
6. Treatment of the activities concerned in the main industrial and product classifications	13
7. Treatment in specialist methodologies	14
7.1 The Frascati family of manuals.....	14
7.2 The model survey of computer services	16
7.3 The OECD training statistics manual.....	16
7.4 Other sources of methodology and data.....	16
8. Company accounting conventions	16
9. Empirical studies	18
10. Conclusions.....	20
10.1 Computer-linked	20
10.2 Technology and production.....	20
10.3 Human resources	21
10.4 Organisation of the firm	21
10.5 External: Marketing and sales	22
10.6 Industry-specific.....	22
REFERENCES	23

TOWARDS AN INTERIM STATISTICAL FRAMEWORK: SELECTING THE CORE COMPONENTS OF INTANGIBLE INVESTMENT

1. Introduction

Recent developments in economic theory provide attractive new conceptual frameworks for analysing intangible investment, as shown in the preceding paper in this series (Clement, Paper 2). However, our understanding of national innovation systems is only just reaching a stage when a few new indicators can be proposed, but not a complete new statistical framework which can be translated into a new set of national and international surveys.

As was recognised at the 1992 Workshop, considerable work is still needed on the concepts and the likelihood of special surveys is low. There is thus a need for an interim set of guidelines for the measurement of intangible investment, making the best use of existing concepts, statistical frameworks and national and international data sources.

The aim of this summary overview is to set the scene for the practical recommendations in the next paper (Vosselman, Paper 4) by reviewing the possible components of intangible investment in the light of the information in Papers 5 to 10.

2. An initial list of intangible investment components

The first step is to establish as full as possible a list of intangible investments. In theory, practically all services activities could be perceived as having some investment content (see Vosselman, Paper 4). In practice, a certain number can be considered as being mainly investment activities.

Figure 1 shows such a list of “possibles”. It is divided into six categories which are a development of the TEP categories (OECD 1992*a*) and also reflect some of the groupings in the preceding paper (Clement, Paper 2). Intangibles form a closely woven texture and the six categories are intended only to present the topics and do not pretend to be exhaustive or mutually exclusive. For example, carrying out R&D (industrial technology) brings about “learning by doing” (human resource development) similarly a database (computer-related) may contain subscriber lists (marketing) or underpin “reorganisation of the firm”. The first five: *i*) computer-related; *ii*) production and technology; *iii*) human resources; *iv*) organisation of the firm; and *v*) external (marketing and sales) could occur in almost any company or industry. The last category covers three types of intangible investment which are peculiar to the industries concerned: mineral exploration; entertainment, literary and cultural originals; and milk quotas.

Figure 1. **Possible components of intangible investment**

1. Computer-related

Software
Large databases
Other computer services

2. Production and technology

R&D
Design and engineering
New quality control systems
Patents & licences
Know-how

3. Human resources

Organised training
Learning by doing
Activities to improve health and motivation of the workforce (incl. labour relations, physical check-ups and other sport and fitness programmes)
Remuneration for innovative ideas

4. Organisation of the firm

New methods of organisation of the firm as a whole
Setting up networks
New working methods in administration and finance

5. External: Marketing and sales

Market research
Advertising
Brands
Name and symbol of the firm
Customer list, subscribers list and list of potential customers
Product certification, quality certificates
Goodwill

6. Industry-specific

Mineral exploration
Entertainment, literary and artistic originals
Milk quotas

3. Criteria for selecting “core components”

The next step is to review this list in the light of a set of criteria to see which of these sub-categories should be retained as “core components” of intangible investment and which present too many theoretical or practical difficulties to be included systematically. A list of suggested criteria is given in Figure 2.

Figure 2. **Criteria for deciding on the core components of intangible investment**

A. Initial criteria

Are they long-term outlays by firms aimed at improving their future performance (other than by the acquisition of fixed assets)?

B. Additional criteria

1. Can they be expressed in a way which is analogous with the production and acquisition of tangible capital?
2. How are they treated in the System of National Accounts 1993?
3. Are the services concerned specified in the latest UN classifications of industrial activities and products?
4. Are there any relevant special statistical methodologies and data sources?
5. How are they treated in company accounts and reports?
6. How have they been treated in experimental national and international surveys of intangible investment?

4. Some investment terminology

4.1 Need for the test

One of the main reasons for compiling data on intangible investment is to make comparisons with the amount of tangible or physical investment. This means presenting intangible investment data, as far as possible, in the same way as the tangibles statistics and thus applying concepts and categories designed for the latter to the former. The degree to which this can be done is one of the factors fixing whether a given activity which is conceptually part of intangible investment should be treated as a “core component”.

4.2 The example of tangible investment

Tangible investment is the acquisition of a **good** which can be used to produce a future flow of products (goods or services), for example a paper mill. In most cases investment goods are produced by one firm (and industry) and purchased and used by other firms (and industries). For example, the paper mill is produced by firm A (supply) in the plant and equipment industry and purchased by firm B in the

pulp and paper industry (demand). The cost to firm B is the “purchaser’s price”, which is higher than the “producer’s price” as it may include the value of non-recuperable VAT and transport costs.

This is the simplest case. In others, the producing firm may take more than a year to construct the mill so it will be registered as “work in progress” or the supplier may fail to sell it in the year of production so it enters “stocks”. Firm A may lease the paper mill to firm B, in which case A remains the **owner** but B has the **right** to use it. Firm B, the investor, may construct the paper mill itself or may purchase a second-hand plant. In the latter case, there is only a **transfer** rather than new investment at the level of the country (except in the case of an imported second-hand paper mill).

Over time it is necessary to calculate the rate of **depreciation** of the value of the paper mill. This involves making assumptions about trends in its relative efficiency and the present prices of replacement plant.

Figure 3. Check list for situating intangibles in an investment framework

A. Main questions

1. Who is the producer?
2. What is the production activity?
3. What is the investment product/asset?
4. Who is the investor?
5. How will the investment product/asset increase the investing firm’s future performance?

B. Supplementary production questions

Is most production undertaken

- by specialist firms?
- by a specialist unit in the investing firm?
- diffused within the investing firm?

2. Is it usual for the production activity and the subsequent use of the investment product/asset to take place in different countries?
3. Does the production of the investment good/asset take more or less than one year?

C. Rights

1. Is there a “right” corresponding specifically or generally to the use of the investment product concerned?
2. Is leasing a common way of obtaining the “first-hand” use of the product/asset concerned?

4.3 Basic tenets applied to intangibles.

It is both enlightening and frustrating to apply these concepts to the items initially included in intangible investment. For each one we should be able to specify: the producer, the production activity, the investment product asset, the investor, the owner and the right to use the investment product for future production. It is also useful to consider how the asset will improve the performance of the investor.

These questions are shown in the check list in Figure 3. It also covers some supplementary questions on production which are intended to identify typical relationships between the producer and the investor, including their geographic relationship. For example, if most production is undertaken by specialist firms we can treat the **output** of the **industry** concerned as a proxy for the investment in the product. If, as in the case of R&D, much of it is undertaken within the investing firm, this approach is not valid. The other questions invite reflection about trade in the investment product and whether there are problems of “lumpiness” or “work in progress”. The second set of supplementary questions deals with rights and leasing.

Figures 4-9 present an initial attempt to answer the main questions for the five groups of potential intangibles listed in Figure 1. They do not pretend to be exhaustive or based on coherent set of concepts or to cover all the specifications necessary for rigorous treatment as in the SNA (see below). For example, the “investment product” is presented in different ways including any tangible forms in which it may be expressed (films, diskettes, prototypes, etc.) (see also Hill, 1997). In the knowledge-based economy (KBE) approach, one would quote the type of knowledge involved.

Figure 4. Computer-related

Type of intangible	Producer	Production activity	Investment product	Investor	Improved performance	Right
SOFTWARE	Bought a) hardware firm b) other service firm	Writing software programs & instructions for their use	Software	Machine purchaser Package purchaser Service purchaser	More productive use of new or existing computers	Licence to use software in machine or package
	In-house c) DP dept. d) other depts.		System software Packaged software Service software			
MAJOR DATABASES	a) database firm b) other service firm	Setting up database	Database Database	Performing firm Performing firm	Future sales of data Future sales of data	?
		A: For selling data Setting up database on own account Setting up base on own account				
B: For single user	a) database firm b) other service firm c) user firm	Setting up custom base Setting up custom base Setting up custom base	Information in the database	User-firm User-firm User-firm	Use of information for own marketing, etc.	

Figure 5. Production and technology

Type of intangible	Producer	Production activity	Investment product	Investor	Improved performance	Right
Research and experimental development	a) R&D firm b) R&D dept c) production staff	Performing R&D contracts Performing R&D projects Performing informal R&D	R&D results Prototypes Pilot plant	Firm financing the R&D and owning the results	After further steps, introduction of new products and processes	Patent
Design and engineering	a) D&E firm b) Engineering dept. c) production staff	Engineering steps between end of R&D and innovation	New products New processes	Firm financing the R&D and owning the results Performing firm Performing firm	Sales of new products Use of new processes	
Artistic design	a) Design firm b) other service firm c) own design staff	Producing artistic designs for products	The design (sketches, etc.)	Purchaser User firm	Sales of more attractive products	“Toile”

Figure 6. Human resources: training and other

Type of intangible	Producer	Production activity	Investment product	Investor	Improved performance	Right
TRAINING						
FORMAL	a) training firm b) training dept	Teaching Teaching+learning	Skills Skills	Purchaser Purchaser	Improved future productivity of those trained	
INFORMAL	c) diffused	“sitting by Nellie”	Skills	Purchaser	Improved future productivity of those trained	
OTHER DEVT OF HUMAN RESOURCES						
Health checks	a) commercial service b) internal health dept	Performing health tests +being tested	Early identification of health problems	Purchaser Financing firm	Improved labour productivity	
Sports facilities	a) commercial gyms, etc. b) in-house facilities	Providing facilities +using them	Fitness of staff Less absenteeism	Purchaser Financing firm	Improved labour productivity	

Figure 7. Organisation of the firm

Type of intangible	Producer	Production activity	Investment product	Investor	Improved performance	Right
Re-organisation of firm	a) consultants b) central management	Advising Designing and applying	New firm structure etc.	Purchaser Firm concerned	?	No
Specific advice	a) consultants b) computer consult. c) in-house ????	Advising advice+mach+software designing and applying	Advice productivity in depts	Purchaser Firm	Increased productivity in depts	No

Figure 8. Marketing and sales

Type of intangible	Producer	Production activity	Investment product	Investor	Improved performance	Right
Market research	a) MR firm b) in-house mkt dept c) in-house nec	Market research	Information about markets	Purchaser Performer Performer	After further steps, introduction of new products and processes, better distribution of existing products Improved sales	Brands
Advertising	a) Ad agency b) in-house mkt dept c) in-house nec	Design of campaign and of ads, organising their preparation and carrying out the campaign	Influence over consumers	Purchaser Performer Performer		

Figure 9. Industry specific intangibles

Type of intangible	Producer	Production activity	Investment product	Investor	Improved performance	Right
A. ARTISTIC Books	Author Publisher (printer)	Writing Editing, proofs, etc.	Book Final proofs	Publisher	Royalties Sales of books	Copyright
Films	Film maker	Making film Producing final version	Original(s) for distribution		Earnings from distributors	Film right
Recordings	Orchestra Disc company		Original recording Disk for reproduction	Recording company	Royalties Royalties	Recording right
Designer clothes	Dress designer	Producing original	Toile		Royalties	Reproduction
B. MINERAL EXPLORATION	a) Commercial service b) Expl dept.	Searching for resources	Knowledge of existence/ non-existence of resources	Commission firm Performing firm	Ability to maintain future output	?
C. MILK QUOTAS	None	None		Purchaser from current owner	Increase milk output	Milk quota

This already sorts the potential list into production activities (the majority), investment products (software; entertainment, literary and artistic originals) and rights (milk quotas, goodwill, patents, trademarks, brands, etc.). For two of the latter, milk quotas and goodwill, it is very difficult to identify the corresponding production activities. Milk quotas are a legal construct of the Common Agricultural Policy. Goodwill is only valued when a firm changes hands and measures a residual value of all past intangible investment not incorporated in specified assets. They can conveniently be described as “non-produced” assets and, though of considerable commercial value to individual firms, do not add to the assets of the industries concerned when they change hands.

4.4 Relationship between tangible and intangible investment and between intangibles

It is well known that intangible investment is often associated with tangible investment in new plant and equipment, incorporating advanced production processes. For example, a supermarket buys new “Point of sales” equipment which requires retraining the cashiers.

The production of an intangible asset may itself require investment in physical capital, for example the purchase of a computer by a market research company. In principle this is no different from investment in physical capital for the production of a physical capital product, for example the purchase of a computer by a machine tool company. In general, such expenditures are treated as gross fixed capital formation in the year concerned by the investing firm and industry. However, only a share of the cost of the equipment is included in the cost of production of the supplier firm and industry in the year concerned. For example, we have three firms. A, a cheese manufacturer, B, a market research company and C, a computer manufacturer. Firm A commissions a market research study from B, as a result of which A gains an investment product in the form of information about probable future cheese consumption. During that year, B carries out the market research survey and buys a new computer from C for this and future work. Only part of this cost is charged to A. Conceptually, the same approach should be applied to intangible investment to carry out an intangible investment activity, for example the acquisition by the market research firm of new investment products in the form of software or skills derived from training. Further examples are given in Figure 10. In general, reflection on the “products” and “production activities” helps to eliminate double counting when data are compiled from different sources. Figure 11 is provided as a framework for checking the coverage and coherence of a final set of data on tangible and intangible investment, or indeed for a single category of intangible services. Practical solutions for individual categories of intangibles are discussed in Paper 4 in the set. It also deals with the main case where an activity can, apparently simultaneously, be two categories of intangible investment: R&D and software production.

Figure 10. **Examples of tangible and intangible investment for the production of goods and services**

Type of firms investing	Type of investment product	
	Tangible (good)	Intangible (service)
Producing investment goods	Computer firms buys welding equipment	R&D to design paper mill Market research before launching a new computer model
Producing other goods	Paper mill bought by pulp and paper company	Training staff to use new paper mill Introducing quality circles in a refrigerator manufacturing company
Producing “investment” services	Computer bought R&D lab Computer bought by software firm	Packaged software bought for R&D lab R&D to design entirely new network software
Producing other services	New POS equipment for supermarket New plant for newspaper publisher	Training cashiers for new equipment in supermarkets Reorganisation of office procedures in an insurance firm

Figure 11. Check matrix for combining and comparing total tangible and intangible investment

Industry making the investment		Type of investment product								
		Capital goods			Capital services (intangibles)			Total		
		Domestic		Imported	Domestic		Imported	Domestic		Imported
		Own acct.	Purchased		Own acct.	Purchased		Own acct.	Purchased	
Goods producing industries	Capital goods									
	Other goods									
Services producing industries	Capital services									
	Other									
Government & PNP										
Exports										
Total										

5. Treatment of possible components of intangible investment in the System of National Accounts

The System of National Accounts is the ultimate international economic statistical framework. Whatever one's opinion of its underlying theory, it must be accepted as perhaps the most important influence on the development of statistical methods.

The 1968 version, which was current at the time of the Workshop, paid very little attention to intangible investment. System software was regarded as a tangible investment, because of its embodiment in a tangible asset. Of the remaining components, acquisition of patents and copyright were recorded as the purchase of a (non-produced) "intangible" asset. The other intangibles were accounted for as current costs (in case of purchase of service) or as labour and material costs, including some depreciation (in case of in-house production for own use).

During the revision exercise leading up to the System of National Accounts 1993 (CEC *et al.*, 1994), there was substantial discussion of the nature of investment and the possibility of including some intangibles. The outcome of these discussion is summarised in Figure 12. A category of "produced intangible assets" was introduced which includes software and major databases; entertainment, literary and artistic originals; and mineral exploration. The renamed "non-produced" intangible assets category now covers patented entities, leases (except for machinery rental) and other similar contracts (presumably including milk quotas) and purchased good will.

The SNA 1993 admits that expenditures on R&D training, market research, advertising, health and welfare are intended to enhance productivity or to increase the range of production possibilities in the future. However, the experts felt that these activities did not lead to the creation of assets that can be easily identified, quantified and valued for balance sheet purposes. In consequence, such expenditure continues to be treated as intermediate consumption in industry. Nevertheless, a special new functional classification (Classification of Outlays of Producers by Purpose -- COPP, reproduced as Figure 13) is proposed, which, if applied, would provide a way of compiling expenditure on selected intangibles. Satellite accounts are proposed for R&D, data processing and all education activities as a whole. Several countries have already attempted such satellite accounts for R&D.

Figure 12. Summary of treatment of intangible components in the revised SNA

	Capital		Consumption		
	Intangible fixed assets	Intangible non-produced assets	Total	Separately identified in	
				COPP	Satellite accounts
1. Computer-linked Software Databases ¹ Data processing	x		x		x
2. Production and technology R&D Engineering and technology Patents Licences and	x		x x	x x	x
3. Human resources Training Welfare and morale			x))x	x ²
4. Management and administration General administration			x		
5. Markets and sales Sales promotion Brands Goodwill			x	x	
6. Industry specific Mineral exploitation Entertainment, literary and artistic Milk quota	x x	x			

Notes: 1.
2.

Figure 13. Classification of selected outlays of producers by purpose (COPP)

Categories of COPP	P.2	D.1	D.29-D.39	K.1	P.51
1. Outlays on current production programmes					
2. Outlays on repair and maintenance					
3. Outlays on engineering and related technological work					
4. Outlay on research and development					
5. Outlays on pollution abatement and control					
6. Outlays on sales promotion					
7. Outlays on external transportation					
8. Outlays on employee training, welfare and morale					
9. Outlays on general administration					

P.2 Intermediate consumption.

D.1 Compensation of employees.

D.29-D.39 Other taxes less subsidies on production.

K.1 Consumption of fixed capital.

P.51 Gross Fixed Capital Formation.

Source: SNA 1993 (CEC *et al.*, 1993), Table 18.4.

The treatment of intangibles in the SNA 1993 is described at greater length in the sixth paper in this series.

6. Treatment of the activities concerned in the main industrial and product classifications

The United Nations International Standard Industrial Classification (ISIC) has been revised (ISIC Rev 3) (UN, 1990) and is currently being implemented in national and international surveys. It has been supplemented by a new classification of products (the CPC) (UN, 1991) which is as yet provisional. The services section of the latter was produced by the Voorburg Group of specialists on services statistics.

If the production activities for intangible investment products or the products themselves are separately identified in these two classifications, the chances of measuring them in the near future are significantly improved, especially for those which are mainly bought from specialist service companies.

Figure 14. Treatment of intangibles in ISIC Rev.3 and the provisional CPC

	ISIC Rev. 3		CPC	
	Sep.	Code	Sep	Code
1. Computer-related software Databases	x x	722 Software consultancy and supply 724 Database activities		Overtaken by classification in UN model survey of computer services
2. Technology product in R&D Engineering and technology Patent./ Patents Designs	x P. P. P.	Division 73 R&D 7421 Architectural & engineering services 7411 Other business activities 7499 Other business activities nec.	x x x x	Division 87 R&D 8762 Engineering services 8921 Patents ¹ 87907 Speciality design services
3. Training and human resources -- Training -- Other	?	Not specified unless included in 94200 Adult education services NEC 7414 Business and management consultancy 7491 labour recruitment and provision of personal	?	Not separately available: Included in the services concerned 86504 Human resource consulting 87201 Executive search services
4. Central administration -- General management -- Administration and fiscal	P	7414 Business and management consultancy	x	86501 General management costing services 86505 Production Management utility services
5. Marketing, etc., and market research -- Advertising -- Marketing -- Trademarks	P x	7413 Market research & public opinion polling 7430 Advertising	x x x x	86401 Market research services 871 Advertising services 86503 Market management consulting services ¹ 89230 Trademarks
6. Special industry Mineral exploitation Entertainment, etc., originals Milk quotas, etc.	x	7421 Architectural and engineering activities and related technical consultancy	x x	867 Geological, geophysical and the scientific prospecting services ¹

1. Non-financial intangible assets.

Figure 14 summarises the situation. The actual definitions will be found in Paper 7 in this series. The table reveals that R&D and software and database activities now merit their own industries. Most of the other categories can be distinguished in the provisional CPC if not in ISIC Rev.3. The most difficult of all to identify is **training**. It is not clear where, compared with main function, the provision of training should be classified. The CPC includes training with the corresponding service, for example computer training with computer services.

7. Treatment in specialist methodologies

The compilation of intangible investment data will be easier if there are already internationally accepted statistical standards and surveys for the component concerned.

7.1 The “Frascati family” of manuals

The OECD Group of National Experts on Science and Technology Indicators (NESTI) has produced a set of guidelines for measuring scientific and technological activities and undertakes the associated national surveys. Three of these manuals are relevant to the current exercise: *i*) The *Frascati Manual* on R&D (OECD, 1994); *ii*) the TBP Manual on the Technology Balance of Payments (OECD, 1990); *iii*) the *Oslo Manual* on the measurement of technological innovation (OECD, 1992*b*; OECD/Eurostat, 1997).

The *Frascati Manual* has been in existence since the early 1960s, and the fifth edition was published in 1994. OECD maintains a major database of R&D statistics. These series are not designed for use for measuring intangible investment and require a certain amount of adjustment to meet the latter need. These adjustments are discussed in the next paper and at greater length in the eighth paper in this series.

The Technology Balance of Payments measures flows of funds between country for patents (purchase, sales), licences for patents; know-how (not patented), models and designs; trademarks (including brands), technical services, finance of industrial R&D outside national territory. It excludes commercial, financial, managerial and legal assistance, advertising, insurance, transport, films, recordings, material covered by copyright, design and software. The data can be taken as a proxy for imports and exports of category 2 intangibles, but excludes transfers within the country or for any other category of intangibles. OECD maintains a reasonable base of global TBP data but with no information on flows between industries.

The *Oslo Manual* on the measurement of technical innovation was only issued in 1992 and the first extensive international (CIS) survey, organised and financed by the European Commission, in co-operation with OECD, has recently been completed. The second edition was published in 1997 and a second CIS is currently in progress.

The theory of innovation, cited extensively in the first and second papers in this compendium, is still developing and its extension to social innovations is making it increasingly difficult to distinguish from the wider concept of investment in knowledge and competence presented by Professor Clement (Paper 2). The *Oslo Manual*, however, covers only **technological** innovation.

As it currently stands, it is difficult to derive a set of data on intangible investment from the results of innovation surveys. (Data for Finland suggest that only about half intangible investment is

associated with technological innovation.) Such surveys only cover intangible activities associated with the implementation of technologically new products and processes but include the associated physical capital (Figure 15). The first edition of the *Oslo Manual* and surveys only covered manufacturing whereas the second edition and survey also include marketed services. The second edition of the Manual also includes an annex dealing with non-technological innovation, e.g. concerning organisational change.

Figure 15. **Treatment of selected activities in expenditure on innovation activities and intangible investment**

	Innovation for new products and processes = FNPP	Intangible investment
R&D	All included	All included
Training	FNPP only	All
Software	FNPP only	All
Marketing	FNPP only	All
Rights	Technology only	Also artistic, etc.
Mineral exploration	Some in R&D	All
Development of the organisation	Currently excluded ¹	Major reorganisation included
Design & engineering	FNPP only	Exclusion proposed
Other production activities	FNPP only	Excluded
Acquisition of plant and equipment	FNPP only	Excluded

1. First surveys only covered manufacturing so not relevant.
2. Surveys based on the first edition of the *Oslo Manual* (OECD, 1992b) exclude introduction of new processes in support departments such as finance or sales. In the revised edition (OECD/Eurostat, 1997), technological innovation in ancillary activities is included.

Furthermore, the surveys deal with various aspects of the innovation behaviour of firms. Only one table requests information on innovation expenditure. The first CIS used the model shown in Figure 16 and the response from firms was very poor. The question was rephrased in the second CIS with slightly different categories, for example training is identified separately, but omitting the distinction between current and capital expenditure.

Figure 16. **Typical costs question in a survey of technological innovation circa 1992**

--	R&D	
--	Patents and licences	
--	Product design	
--	Trial production	
	training and tooling up	
--	Market analysis	
	Total	100%
	of which	
	Machinery	
	External services	

7.2 *The model survey of computer services*

This was designed by the Voorburg Group and adopted and published by the United Nations in 1992. It consists of a set of “modules” dealing with different measures of computer services activities (including R&D) to be added to the appropriate surveys of industry. It provides a revised classification of computing activities to replace those in the provisional CPC which deals extensively with software and also specifies database services.

If and when its recommendations are introduced by national survey agencies, they should be able supply much of the information needed for measuring intangible investment in software, especially packaged software, and also some data on databases. For further details see the ninth paper in this series.

7.3 *The OECD training statistics manual*

Work has just been completed on a set of OECD guidelines for training statistics (Murphy and Klee, Paper 10). Its application is still at an early stage.

7.4 *Other sources of methodology and data*

In the computing area there are a number of commercial data services which can provide relevant but usually expensive data. Data on advertising and marketing can also be obtained from national and international trade sources.

8. **Company accounting conventions**

Although this paper concentrates on the need for economic statistics on intangible investment and on conventions for treating services with investment characteristics, some comments on accounting rules are appropriate.

Accounting rules are of interest to statisticians. First of all it should be noted that in order to obtain economic statistics concerning enterprises, the latter must have suitable internal sources of data. Collecting statistical data may be severely hampered by insufficient data availability within firms.

The official accounting conventions set the standard, although firms may also keep internal accounts using deviating accounting rules. Correspondence between statistical definitions and accounting rules has many advantages, i.e. data definitions are crystal clear, thus facilitating answering the questions. Furthermore, firms have easy access to the data in question, which results in a better response and homogeneous data.

In all OECD countries, it is permitted to enter a few intangible items in the balance sheet. Common topics are: R&D expenses, costs for concessions, for patents and licences, paid goodwill, etc. However, international harmonization of accounting rules suffers from the same weakness as harmonization of statistics: differences between national standards were large from the outset and progress has been made, but only rather slowly.

Nevertheless, the fact that firms may enter services in the balance sheet does not imply any obligation to do so. Insertion is compulsory in several OECD countries and as a result only a minority of the firms treat these expenses as an investment.

Finally, balance sheet information pertains to the group of enterprises; often no balance sheet information is available for single enterprises, which hinders the production of useful statistics, especially relating to industry branches or size classes.

Most likely, balance sheets cannot act as a source of statistical data on intangible assets, in particular not in the short term. For recent developments, see Papers 11 and 12 in this series.

Figure 17. Nature of intangible assets recognised

	Patent/Trade Marks/Brands Licences/Publishing rights, etc.	Research & development expenditure	Computer software	Company formation expenses	Human resources, training	Purchased goodwill
Australia	Yes	Yes	NS	NS	NO	Yes
Belgium	Yes	Yes	NS	Yes	NO	Yes
Canada	Yes	Yes	NS	NS	NS	Yes
France	Yes	Yes	Yes	Yes	NS	Yes
Germany	Yes	No	NS	Yes	NO	Yes
Italy	Yes	Yes	Yes	Yes	NO	Yes
Japan	Yes	Yes	Yes	Yes	NO	Yes
Luxembourg	Yes	Yes	NS	Yes	NS	Yes
Netherlands	Yes	Yes	Yes	Yes	NS	Yes
Portugal	Yes	Yes	Yes	Yes	NS	Yes
Sweden	Yes	Yes	Yes	NS	NS	Yes
Switzerland	Yes	Yes	NS	Yes	NS	Yes
Turkey	NS	NS	NS	Yes	NS	Yes
United Kingdom	Yes	Yes	Yes	NS	NS	Yes
United States	Yes	No	Yes	NS	Yes	Yes
European Community	Yes	Yes	NS	Yes	NS	Yes
ISASC	Yes	Yes	NS	Yes	NS	Yes
UN-ISAR	Yes	Yes	NS	Yes	NS	Yes

NS: Not specified.

Source: OECD Working Group on Accounting Standards, 1991.

In short we may identify four levels of relevance in companies: *i*) when the activity can and is treated as a capital item in the company accounts; *ii*) when it is described in the company's annual report and a sum is quoted, which is now standard practice for R&D in the United States or the United Kingdom; *iii*) when the activity is subsidised in some way by the government, for example through a tax break, or is covered by regulations of some kind, such as training in France; *iv*) where the management has some idea of the activity and how much is spent on it for purely internal planning reasons.

It may be suggested that the understanding of intangible investment activities and the possibility of putting a cost on them will be greater in large companies which may have specialist units such as R&D

labs or marketing departments, particularly in modern industries and much lower in small and medium-sized enterprises in traditional industries where any such activities may only be undertaken in a very diffuse way.

9. Empirical studies

The original international survey in this area was that undertaken for the OECD in 1987 (Kaplan, 1987). This paper listed a number of possible intangible investment items before settling on four “core components” for which data could be compiled for a number of countries. They were R&D, software, training and marketing.

Six countries, Finland, France, the Netherlands, Norway, Sweden and the United Kingdom, contributed papers to the December 1992 Workshop describing national exercises to measure intangible investment and to compare it with tangible investment. They are summarised in the fifth paper in the series. Later information on Austria (Hammerer, 1996) and the Netherlands (Minne, 1996) has been added.

Two countries, Finland and Norway, had undertaken more than one special survey using tailor-made questionnaire on intangible investment. In Sweden, additional questions, on R&D, software and marketing, had been added to a regular industrial survey. One of the two Austrian exercises involved a pilot survey of the electronic and electrical engineering industries. The studies for France, the Netherlands, the United Kingdom and one Austrian exercise were straight compilation exercises combining data from existing sources. These compilations covered all industry, whereas the surveys covered large firms in manufacturing (Sweden), mining and manufacturing (Norway) and mining, manufacturing and utilities (Finland).

All the exercises included investment in R&D. In all except Norway and Sweden, the data used were the results of national R&D surveys. Only in Norway do efforts seem to have been made to adjust the R&D data to match the special requirements of intangible investment analysis.

Software investment was also included in all the exercises, as were at least some aspects of marketing. All except Sweden included training.

Some types of “rights” were included in all except Sweden. In France and the United Kingdom the data are actually payments on the Technology Balance Payments and this source was also used in the Netherlands. Both Finland and Norway specifically included payments for “goodwill”. Only Finland specifically included mineral exploration. (The available data could not be used in the Netherlands because of problems of statistical secrecy.)

Figure 18. Coverage of intangible investment in seven country studies

	Austria	Finland	France	Netherlands	Norway	Sweden	UK
R&D	x	x	x	x	x	x	x
Training	Further education	x	x	x	x		x
Software	x	x	x	x	x	x	x
Marketing	Market research Advertising, Public relations	“Long-term marketing”	Advertising Commercial investment	Advertising External market	“Market development”	Marketing	Advertising
Rights		Goodwill , patenting	TBP	- Patents - Copyright - Licences (TBP) (confidential)	incl. in market development		TBP
Mineral exploration		(included in other)					
Other		Development of organisation		Services of management consultants	Working environment development		
Source	Compiled	R&D survey Special survey	Compiled	Compiled	Special survey	Added questions to regular investment survey	Compiled
Coverage		- Other mining - Manufacturing - Electricity, gas & steam	Total industry	Total industry	- Oil extraction - Mining and quarrying - manufacturing	Firms with over 500 employees in manufacturing	Private sector
Years	Mixed, 1992-94	1985 1987 1989	1974 1981 1985 1989	Total 1975-88 Manufacturing 1985-88	1986-90	1987-91	1988 or nearest year available
Classifications	None	- industry - size	None	of which manuf.	- industry - size - region	- industry	Of which manuf.
Comparison with tangible investment	x	x	x	x	x	x	x

10. Conclusions

The outcome of this review is clear for some of the proposed list of intangibles but less so for others. In this section six “core components” are suggested for inclusion in all studies of intangibles. The other are matters of opinion and/or of availability of data for the country concerned.

10.1 *Computer-linked*

Here the core activity is investment in **software**. Software to be used for more than one year is treated as a form of intangible produced asset in the SNA 1993, which also gives a minimum set of instructions for its measurement. The corresponding industrial activity is specified in ISIC Rev.3 and guidance on measurement can be found in the model computer services survey (UN, 1992). Finally, in practice, most countries seem to have collected some relevant data already.

The SNA definition of software as an intangible fixed asset also includes “large expenditures on the purchase, development or extension of databases that are expected to be used for more than one year.” Such databases can be of two kinds, those set up by firms with the aim of selling the contents to users in other industries and those set up by firms for internal use. It is specified that both marketed and non-marketed bases should be included.

In the first case, if the company concerned provides an on-line information retrieval service it is covered by “database services” in the UN model computer services survey. If does not have on-line access, for example if it only sells special extractions to order, it is not.

In the second case, that of data for internal use, the purchased, developed or extended database may be a tool for one aspect of the firm’s activity, for example billing or marketing. This may include purchasing information from a market producer database firm. However, the combination of new databases and networking can also underlie major changes in the whole information system and organisation of the firm.

Some relevant data about database firms (and perhaps establishments) will become available from the results of surveys using the UN computer services modules. However building up in-house databases would seem much more difficult to measure. Until the SNA is supplemented by specific guidelines on in-house bases and how to distinguish between long- and short-term aspects of databases, particularly in the case of subscriptions and network access, it is suggested that database acquisition/construction should not be a core component of intangible investment.

10.2 *Technology and production*

Research and experimental development (R&D) is clearly the core component in this category. True it is still treated as intermediate consumption in the main text of the SNA 1993 but this new version recommends that a separate unit should be declared at establishment level within firms and that satellite accounts should be prepared. The activity is separated out in all the classifications reviewed. R&D is a meaningful concept to most large companies and is specially treated in company reports in many of them. It is covered by recommended accountancy practice in a number of countries. International methodology and data for R&D data are already available, with a breakdown by industry.

Data on international trade in industrial technology can be derived from the TBP series. In countries with an as yet small indigenous industrial R&D effort, purchases of technology from abroad can be an important form of intangible investment and are recommended for inclusion.

Patents are a **right** associated with the output of some but not all R&D efforts. They could be treated either in this group or in a generic “rights” category, as is done in the next paper.

Ultimately it would be interesting to establish a way of measuring investment in all the intangible technological activities leading up to innovation (introduction of new products and processes), notably design and engineering. This must probably be postponed until after more experience has been gained with innovation surveys proper.

Artistic design is classified in a different part of standard industrial classifications from engineering design. The revised *Oslo Manual* (OECD/Eurostat, 1997) also makes a distinction between “technical innovation” and improvements in products due to artistic design. It has been suggested that it is intangible investment in such artistic design which explains Italian industrial performance despite its low level of industrial R&D. Some information might be available on the sales of design companies but in-house activities would be very difficult to measure.

10.3 Human resources

The core component here is “formal training”. Unfortunately it is not dealt with specifically in the revised SNA or in ISIC Rev. 3 or the CPC. It is part of a broader “human resources” category in COPP classification. It does not appear to receive much attention in company accounts. However, work has recently been completed at OECD and Eurostat to set up a methodology for surveys of training activities (Paper 10) and most of the countries who presented studies to the Workshop had been able to include some data on it.

Measurement of informal training, “learning by doing”, diffused throughout the firm is further away. It might prove easier to obtain some information on activities to improve the long term health and motivation of the labour force though it would certainly be difficult to separate them for other “fringe benefits”. There seems to be little possibility of compiling data on investment in the health and welfare of the workforce.

10.4 Organisation of the firm

This is, as yet, the least well-defined type of intangible investment as the underlying theory is still being developed. The Finnish survey specifically handled “the cost of developing the organisation or the overall functioning of the enterprise” as a sub-category. The Norwegian survey only included the computer-related aspects of “activities improving the administration and control of the entire organisation, administration and production”. The Netherlands study used the sales of the management consulting industry from trade sources as a proxy for this category. A number of pilot studies are described in Papers 13-15. Such consultancy is defined in the provisional CPC.

Despite these advances, until one has a better idea of how much “organisation” investment takes place in-house over and above expenditure on the services of management consultants, it is not possible to decide whether management consultancy can be recommended as a “core component” to represent this category of intangible investment.

10.5 *External: Marketing and sales*

“Marketing” was a core component of the first OECD study (Kaplan, 1987) and one or other of the two following activities appear in most of the national surveys: market research and advertising. These are reasonably easy to identify in ISIC Rev.3 and the provisional CPC, and they are recognisable industries. The problems of distinguishing long-term and short-term advertising are discussed in the next paper, which also deals with the practical treatment of brands.

10.6 *Industry-specific*

Mineral exploration was included in intangible investment in only one of the national studies, that of Finland. It was excluded in Norway even though their special survey intangibles included the mining and extraction industries. The data for the Netherlands could not be used because of disclosure problems. However, mineral exploration is a produced intangible asset in SNA 1993 and the production activities can be identified in ISIC Rev.3 and the CPC. It is suggested that it should henceforth be a “core-component” of intangible investment.

The same arguments apply to the production of entertainment, literary and artistic originals which should, therefore, be included wherever possible when measuring intangible investment.

In the author’s view it would be better to exclude “non-produced assets”, such as milk quotas, from the core components of intangible investment.

The next paper in this set deals with defining the coverage of these core components and the practical problems of using the new or earlier version of the methodologies and sources mentioned above, to actually compile coherent sets of data which can be used for economic analysis.

REFERENCES

- CEC-EUROSTAT, IMF, OECD, UN and THE WORLD BANK (1994), *System of National Accounts, 1993*, prepared under the auspices of the Inter-Secretariat Working Group on National Accounts.
- HAMMERER, G. (1996), “Intangible Investments in Austria”, paper presented to the OECD Conference on New S&T Indicators for a Knowledge-based Economy, Paris, 19-21 June.
- HILL, P. (1997), “Tangibles, Intangibles and Services: A New Taxonomy for the Classification of Output”, paper presented to the CSLS Conference on Service Centre Productivity and the Productivity Paradox, Ottawa, Canada, 11-12 April.
- KAPLAN, M.C. (1987), “Intangible Investment: An Essay at International Comparison”, memorandum to the OECD Industry Committee, OECD, Paris.
- MINNE, B. (1996) “Expenditures in Relation to the Knowledge-based Economy in Ten OECD Countries”, paper presented to the OECD Conference on New S&T Indicators for the Knowledge-based Economy, Paris, 19-21 June.
- OECD (1990), “Proposed Standard Method of Compiling and Interpreting Technology Balance of Payments Data (TBP Manual)”, OECD, Paris.
- OECD (1992a), *Technology and the Economy: The Key Relationships*, OECD, Paris.
- OECD (1992b), “OECD Proposed Guidelines for Collecting and Interpreting Technological Innovation Data (Oslo Manual)”, OECD, Paris.
- OECD (1994a), *The Measurement of Scientific and Technical Activities, Proposed Standard Practice for Surveys of Research and Experimental Development*, “Frascati Manual”, OECD, Paris.
- OECD (1997), *The Measurement of Scientific and Technological Activities, Proposed Guidelines for collecting and Interpreting Technological Innovation Data*, “Oslo Manual”, OECD, Paris.
- UNITED NATIONS (1990), *International Standard Industrial Classification of All Economic Activities*, Statistical Papers Series M, No. 4, Rev.3, UN, New York.
- UNITED NATIONS (1991), *Provisional Central Product Classification (CPC)*, UN, New York.
- UNITED NATIONS (1992), *Computer Services*, UN, New York.