

## The Measurement of Intangible Capital in the National Accounts and Growth Accounts of the Netherlands

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### Abstract

In recent years Statistics Netherlands developed rather complete balance sheets for non-financial assets such as fixed assets, inventories and natural resources. As a satellite accounting exercise, statistics on capital stocks are supplemented by experimental estimates of knowledge assets falling outside the 1993 SNA asset boundary. Examples of such assets are innovative property (research and experimental development and other innovative property) and economic competencies (brand equity, firm-specific human capital and organisational structures). These extended capital accounts are not only expanding the Dutch National Accounts, but also the Dutch Growth Accounts, as they provide a broader picture of the capital inputs of production, including those obtained from knowledge capital. This paper provides a brief overview of outcomes, discusses linkages to productivity measurement and highlights some of the problems of measuring intangible capital stocks, focussing in particular on measuring research and development investment in small and open economies like the Netherlands.

Keywords: knowledge economy, productivity statistics, wealth measurement

### 1. Introduction

The development of non-financial balance sheets at Statistics Netherlands comprises ten years of hard work. The first steps in establishing balance sheets for the non-financial assets were made at the 2001 benchmark revision of the Dutch national accounts. In this process the perpetual inventory method was redesigned according to the first ‘measuring capital guidelines’ of the OECD. This led to a consistent measurement framework for statistics on wealth stocks, productive capital stocks, depreciation and capital services (Van den Bergen et al., 2005). Soon after, Statistics Netherlands allocated funding to developing productivity statistics and better measures of the knowledge economy. In 2007 Statistics Netherlands presented the first Dutch Growth Accounts (Van den Bergen et al., 2008). These ‘KLEMS’ and industry based growth accounts are fully consistent with the annual Dutch supply-use framework.<sup>1</sup>

Since 2010 the asset coverage of the Dutch growth accounts has been extended by several new asset types such as land, subsoil assets and inventories (cf. Van den Bergen et al., 2010). Improved measures of the knowledge economy were firstly presented by way of a R&D satellite account (Van Rooijen-Horsten et al., 2007). Later on the scope of these accounts were further expanded by adopting the Corrado-Hulten-Sichel framework for measuring knowledge investment and capital stocks beyond the SNA boundary (Van Rooijen-Horsten et al., 2008).<sup>2</sup>

The next section provides an overview of the balance sheets for the Netherlands and their coverage in terms of intangible assets. A brief overview of main outcomes are presented in section 3. This section also presents the expansion of the Dutch Growth Accounts by including the inputs from intangible capital. Section 4 highlights a number of measurement challenges with regard to international trade in

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<sup>1</sup> KLEMS refers to the inputs of production: capital, labour, energy, materials and services

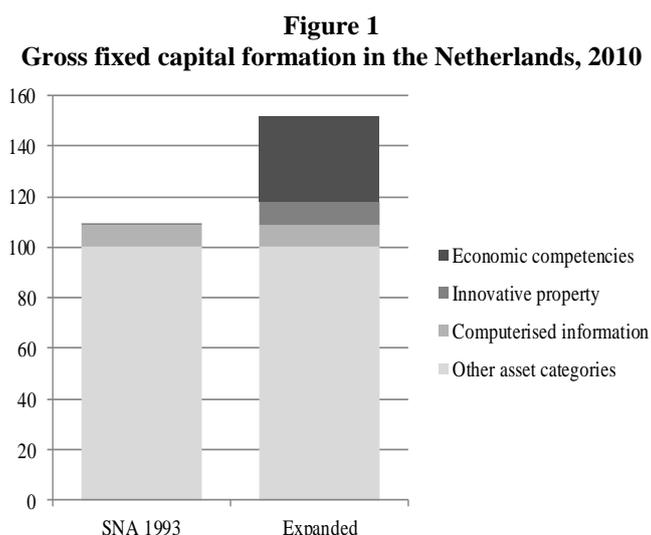
<sup>2</sup> The SNA 2008 does not use intangible capital as an asset category. Instead the name ‘intellectual property products’ is used to address assets such as computer software, mineral exploration, R&D and entertainment, literary or artistic originals.

intangible assets and related services. The last section sums up a few conclusions that can be drawn from this paper.

## 2. Expanding the capital boundary

The expanded presentation of intangible assets in the Dutch Growth Accounts enhances its analytical strength, particularly with respect to the knowledge-based economy. A few years ago a ‘Knowledge Investment Agenda’ of the Netherlands was formulated as a joint effort of the Dutch government, employer organisations, and labour unions to enhance the knowledge orientation of the Dutch economy. Intangible assets may include items such as literary and artistic originals, inventions and scientific discoveries, industrial designs, trademarks and service marks. Ownership of this intellectual property may be enforced by copyright or patents. However, patents or copyrights are not a prerequisite for their recording in the national accounts or growth accounts. A crucial precondition is whether the company can be seen as the economic owner receiving the current and future benefits from investments in intangible capital. This means an asset can be identified and accounted for even if ownership is not legally enforced. Economic ownership may for example be secured by secrecy or the availability of the complementary human capital to make these investments commercially successful.

Representative market prices for intangible capital are often not available as these investments are often made on own account. This means that their value cannot be obtained from market transactions. Alternatively it is assumed that investment costs are a reasonable approximation of the current and future benefits obtained from investment in intangible capital. In reality the returns on investment in intangible assets may be uncertain as only some investments may lead to commercial success.



Source: The Dutch Growth Accounts, 2010

The extended Dutch KLEMS-based growth accounts include the following intellectual property categories:

- Computerised information
- Innovative property
  - R&D\*
  - Mineral exploration
  - Other innovative property\*
- Economic competencies
  - Brand equity\*
  - Firm-specific human capital\*
  - Organisational structure\*.

This categorisation of intangible assets is derived from Corrado, Hulten and Sichel (2006). The items indicated with an asterisk are beyond the SNA 1993 boundary. An important change initiated by the

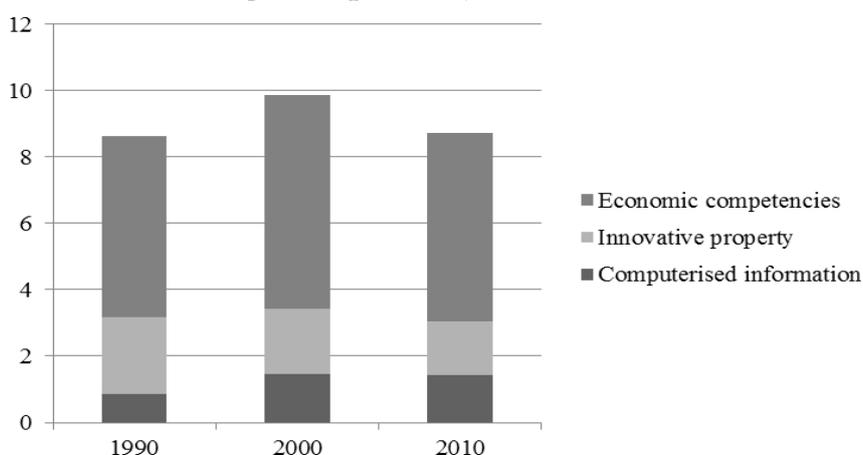
new international national accounting guidelines, SNA 2008, is that expenditure on R&D will no longer be recorded as the current costs of production, but instead as gross fixed capital formation. The implementation of the SNA 2008 in the Dutch national accounts is foreseen in 2014.

The effects of this broader capital concept are highlighted in figure 1, reflecting data of 2010. Compared to the standard national accounts following SNA 1993, gross fixed capital formation is upwardly adjusted by almost 42 billion euro to 152 billion euro when adopting the Corrado-Hulten-Sichel framework. Innovative property includes R&D investment which represents more than 5 billion euro. In the Netherlands mineral exploration is a relatively small innovative property item, which is also included in the standard SNA investment total.

The biggest extension however is caused by the item economic competencies (33.4 billion euro), which lies entirely outside the SNA asset boundary. Economic competencies include brand equity (12.3 billion euro), firm-specific human capital (6.7) and organisational structures (14.4).

The standard national accounts provide perhaps a prudent, but also a somewhat conservative, picture of investment in intellectual property. SNA 1993 estimates show an almost 9% share of intangible capital in total investment. This picture changes drastically when taking into consideration investment in R&D and in economic competencies. Consequently, the share of intellectual property in total investment is upwardly adjusted to almost 34% and the total expansion of gross fixed capital formation entails 38%. This expansion is less substantive in terms of related capital stock adjustments as particularly the asset types under economic competencies are expected to have relatively short service lives.

**Figure 2**  
Gross fixed capital formation in intangible capital  
as percentage of GDP, the Netherlands



Source: The Dutch Growth Accounts, 2010

### 3. Developments of the Dutch knowledge economy

The start of the 21st century was characterised by less favourable trends in intangible capital investment. This development is in sharp contrast with the expanding investments, relative to GDP, in the last decade of the former century. The gradually declining shares of intellectual property investments in GDP suggest that in recent years the Dutch economy has become less knowledge oriented. Both innovative property and economic competencies show gradually declining investments since 2000. Computer software was to a lesser extent affected by these negative trends. Yet, the share of intangible capital investment in total gross fixed capital formation remained almost constant in the 2000-2010 period. So more generally, capital deepening of the Dutch economy is lacking behind, leading to insignificant contributions of capital to economic growth (see Table 1). The financial turmoil that started in 2008 led to a further downturn of investment in intangibles, but even more so in other types of investment.

Similar trends are visible when looking at the volume changes presented in table 1. Again one may conclude that the final years of the former century showed booming investments in intangible capital,

followed by less favourable outcomes in more recent years. In the 1996-2001 period, the contribution of intangible capital to output growth was slightly beyond that of other forms of capital. These results, derived from the Dutch Growth Accounts, sharply diverge from those covering the 2002-2008 timeframe. In more recent years intangible capital hardly contributed to output growth. At the same time economic growth was equally less abundant, compared to the previous period. This decelerating economic growth continued after 2008. On average the Dutch economy did not grow at all in the 2008-2012 period.

**Table 1**  
**Economic performance of the Dutch commercial sector,**  
**average annual growth rates**

<b>Investment in a selected number of intangible assets</b>		
	1992/2001	2002/2010
Software	12.3	1.1
R&D	1.9	-1.4
Brand equity	4.3	-1.1
Organisational structures	5.1	-1.1
<b>Contributions to output growth</b>		
	1996/2001	2002/2008
Output	4.4	2.0
Labour	1.0	0.2
Capital	1.0	0.2
Intangible assets	0.4	0.0
Other assets	0.6	0.2
Intermediate consumption	1.5	0.5
Multifactor productivity	0.8	1.1

Source: The Dutch National Accounts database

#### 4. Measurement challenges with respect to R&D

The brief overview of results presented in section 3 convincingly illustrates that measuring intangible capital matters. At the same time accounting for intangible capital brings about some serious measurement challenges. Investment in intangibles leads to uncertain outcomes, perhaps even more than for other types of investment. This complicates the valuation of intangible assets and assessing their service lives. Many forms of intangible capital are unique by nature and produced on own account. This means that representative market prices are not available. So, the measurement of periodic changes in terms of volumes and prices is equally challenging.

This section focusses on the measurement of R&D investment. As a novel item in the most recent international national accounting guidelines (2008 SNA), capitalisation of R&D resembles a challenge for national accountants worldwide. On-going globalisation complicates determining the location of investment in intangibles on a country-by-country basis. This allocation problem is particularly challenging the national accountants in small and open economies like the Netherlands.

The measurement framework of R&D performance is well developed. In many countries statistics on gross expenditure on R&D are compiled by using the international Frascati guidelines, as developed by the OECD. This statistical information usually provides a solid basis of measuring R&D output. At macro level, the translation of R&D output to R&D capital formation requires a balance of trade for R&D services. Following SNA 2008 conventions, the following accounting identity must, roughly speaking, hold:

$$\text{gross fixed capital formation} = \text{output} - \text{trade balance (export - import)}$$

Please be aware that this identity addresses transactions in R&D assets and not transactions in R&D related capital services.

The R&D balance of trade is less easily measured. Flows of intangible capital may be underreported in international trade in services statistics, as codified knowledge can be transmitted electronically and instantly to other parts of the world without being caught in customs records. This may particularly complicate the recording of intra-company exchange of intangible assets. Head offices may supply R&D to foreign affiliated companies as a way of expanding foreign direct investment. Under these circumstances R&D transfers will not easily be recognised as international trade in services.

In addition, data collections may not support the distinction between payments for the right to use intellectual property (e.g. royalties, licences) for a restricted time period and the actual purchases of intellectual property. Only the latter category of purchases represents gross fixed capital formation. Royalty payments may also relate to assets (brand names, franchises) which are considered 'non-produced' in SNA terms. Such transactions should not be reported as international trade in services.

The success of recording intangible capital transfers within multinational enterprises depends highly on the cost redistribution methods applied by these enterprises. For various reasons, the methods applied may not always be according to an 'arm's length' principle.

#### *Intra-company transfers*

In the Netherlands business expenditure on R&D is concentrated in a small number of (multinational) enterprises. A substantial part of these R&D activities are carried out in the direct neighbourhood of the head offices that are resident in the Netherlands. Given this high concentration of R&D activities, one would expect certain amounts of R&D services to be exported to foreign affiliates. Yet, these exports hardly show up in source statistics. Several representatives of these enterprises confirmed that R&D activities in the Netherlands are supposed to serve production worldwide. This underreporting may partly be caused by the indirect funding methods applied by some of these enterprises. Investigation in the Netherlands showed that the intragroup supply of R&D rarely follows a 'pay on demand' pattern. In other words identification of R&D ownership inside multinational enterprises is not straightforward. The UNECE taskforce on global production is currently developing a decision model to assist national accountants in assigning ownership of intellectual property to the various member entities of multinational enterprises.

#### *Legal versus economic ownership*

As articulated in chapter 7 of the UNECE Globalisation Guide, intangible assets can easily be registered as property in one country while used in production by an entity in another country. This provides companies the opportunity to report the revenues from intangible capital in those countries with favourable tax regimes. Such 'brass plate' companies are neither engaged in the creation of intangible capital, nor are using the intangible capital on their balance sheets in production. One may conclude that these companies are the *legal* owners of intangible assets but not the *economic* owners. The parents of these companies will usually bear the risks, and obtain the rewards, that are associated with economic ownership. For national accountants it will be difficult, if not impossible, to ignore the turnover, value added, and international trade flows reported by these brass plate companies. One may conclude that the brass plate holders of intangible capital are regrettable exceptions to the general SNA rule to follow the principles of economic ownership when accounting for asset positions and related income flows.

#### *Global production and factoryless producers*

One of the features of globalisation is the outsourcing of certain business functions to dedicated suppliers, often located abroad. So-called factoryless producers typically outsourced the entire physical transformation of material inputs to end products to foreign contract producers. As factoryless producers focus their role in the global value chain to activities such as R&D, design and marketing, such companies will usually be significant owners of intellectual property. Under the current international industrial classification guidelines, factoryless producers are classified as traders instead of manufacturers because they are not actively engaged in physical transformation. As a consequence, the income generated by their intellectual property will necessarily be enclosed in wholesale and retail trade margins and will as such be unrelated to the (global) manufacturing of usually high-tech goods. This leads to a distorted picture in economic statistics of such companies. In response, the Task Force

on Global Production recommends reclassifying factoryless producers as a special case of manufacturers instead of distributors.

## 5. Conclusions

Intangible capital and globalisation are both issues leading to measurement challenges. In addition, both phenomena seem interrelated. Globalisation leads to specialisation in specific business functions according to the competitive strength of companies and the comparative advantages of countries. This leads to the fragmentation of production chains in which various, usually highly specialized, companies are active. These companies are not necessarily located in one country. Information and communication technology enables the management of these internationally fragmented production chains from a distance.

The managing entities in these chains are often specialised in activities such as R&D, product design, marketing, gaining consumer trust, logistics, and management. Such companies are highly knowledge intensive, significant economic owners of intangible capital and typically the kind of companies were aspects of globalisation and intangible capital come together. In case these companies are no longer engaged in physical transformation themselves, it is important, (a) to classify these companies properly (as a specific category of manufacturers instead of distributors), and (b) to measure their economic output accordingly (as goods instead of trade margins). This helps to reflect their economic significance and to account for related international trade relationships in an appropriate way.

Several challenges lie ahead when it comes to measuring the international service flows connected to intangible capital. In the Netherlands the identification of economic ownership of intangible capital inside multinational enterprise groups appears to be a thorny issue. As these service flows will usually not show up in customs records, improving observation inevitably requires the extension of surveys. Targets to reduce the burdens on respondents may limit the possibilities of statistical offices to move in this direction. The 'Guide on Global Production' that is currently under preparation by the UNECE is expected to provide further guidance.

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