Statistics Netherlands

The PPI for Software Consultancy services in The Netherlands

Uwe Kirsten

THE PPI FOR SOFTWARE CONSULTANCY SERVICES IN THE NETHERLANDS

Introduction

The Voorburg Group will convene for the 22nd meeting concerning gross domestic product measurement in Seoul, South Korea from 10th to 14th September 2007. Statistics Netherlands has been invited to give a presentation on the producer price index (PPI) for Information Technology (IT) services in The Netherlands. This paper forms the basis to this presentation and specifically describes the case of Software Consultancy services. The structure of this paper has been determined in conjunction with the Voorburg Group.

Content   page

1.   Definition of the service being priced.

The scope of the IT market is depicted in table 1, as it is defined by the "Nomenclature Statistique d'Activité Economique dans la Communauté Activité" (NACE) rev.1.1. The companies that are primarily active in IT services are classified the NACE under code 72, (official denomination: Computer And Related Activities). In the case of the Netherlands, Software Consultancy And Supply (NACE 72.2) is by far the largest industry within the IT sector. Statistics Netherlands has therefore focused on this sector for developing a PPI for the IT services. Within the classification NACE 72.2, the sector Publishing Of Software (NACE 72.21) has an almost insignificant turnover in The Netherlands. Thus Other Software Consultancy And Supply (NACE 72.22) is the remaining sector where Statistics Netherlands has focussed the development of IT SPPIs upon.

Table 1: Activity classification according to the NACE rev.1.1 code 72.xx

Code	Activity Description	PPI in NL	Explanation
72.10	Hardware consultancy	No	Awaiting reallocation of NACE rev.1.1 72 by NACE rev.2, industry is small compared to 72.22
72.20	Software consultancy and supply		
72.21	Publishing of software	Yes / No	Excluded because industry is very small
72.22	Other software consultancy and supply	Yes	Mainly tailor-made software consultancy and supply
72.30	Data processing	No	Awaiting reallocation of NACE rev.1.1 72 by NACE rev.2, industry is small compared to 72.22
72.40	Database activities	No	
72.50	Maintenance and repair of office, accounting and computing machinery	No	
72.60	Other computer related activities	No	

Source: Eurostat

The NACE rev.1.1 will be updated to the NACE rev.2. This update will have a significant effect on the classification of IT services. Congruent to this the European Union (EU) regulations will require Statistics Netherlands to develop a SPPI for Computer Programming, Consultancy And Related Activities (NACE rev.2 code 62). Since June 2007 Statistics Netherlands is developing a PPI for Data processing, Hosting And Related Activities; Web Portals (NACE rev.2 63.1). Software Consultancy And Supply (NACE rev.1.1 72.22) partially covers NACE rev.2 62. Statistics Netherlands will start the development of the missing parts of the updated NACE rev.2 code 62 shortly. A comparison of the NACE and ISIC versions is shown in the appendix.

The SPPI should relate to the *products* of Software Consultancy services and not only to companies whose main activities relate to these services. Statistics Netherlands has used an activity-based company register (comparable with the NACE) to schedule the companies that potentially provides Software Consultancy services. The product-based sample is approached by using a product classification. The Classification of Products by Activity (CPA) offers an internationally comparable classification and the relevant products in the CPA are depicted in table 2. The services that have been included and excluded in the Software Consultancy services SPPI are summarized in more detail in the appendix.

Table 2: Product classification according to CPA 72.22

CPA 72.22.xx	
11	Systems and technical consulting services
12	Custom software development services
13	Systems analysis and programming services
14	Systems maintenance services
15	Other professional computer-related services

Source: Eurostat

2.   Pricing unit of measure.

In the IT services industry an hourly rate is the standard unit used for invoicing services rendered. Only a negligible number of projects are invoiced on basis of success, where some are charged by a mark-up on the service value. With these things in consideration, the hourly charge-out rates have been chosen for the pricing method. In other words the hours worked are determinant for the pricing unit in estimating the IT services PPI.

3.   Market conditions and constraints.

a.   Size of industry.

Table 3 gives an overview of the number of companies and the turnover in the Software Consultancy services industry, stratified by the size of companies according to the number of employees. Software Consultancy services had a turnover of slightly less than €11 billion in 2004. The market for Software Consultancy services was dominated by the 22 companies that have more than 500 employees. These 22 companies had a total market share of 45%, with the largest company having a turnover of about € 1.1 billion and employing over 10,000 people. This share has probably further increased since 2004. The entire industry is serviced by approximately 30,000 companies, which employ over 120,000 people.

Table 3: Number of companies and turnovers NACE rev.1.1 code 72.2 in 2004

Statistics Netherlands Strata Classes	Strata Criterium: Number of employees	Number of Companies	Turnover
0 - 2	0-5	26812	1442247
3	6-10	1219	493745
4	11-20	806	635044
5	21-49	373	1125026
6	50-99	119	749535
7	100-249	36	714066
8	250-499	31	876864
9	500- ∞	22	4738286
Total	---	29.418	10.774.814

Source: Statistics Netherlands

b.   **Special conditions or restrictions.**

The Dutch market for Software Consultancy services is very dynamic, as is evident by the level of mergers and takeovers. For instance, the largest company took over 8 other companies during the last 24 months. Furthermore, at least 10 other large companies have been involved in mergers or takeovers. As a result we have seen a reduction in the stratum of companies with more than 500 employees from 22 companies in 2005 to 15 companies in 2007. The dynamics is also evident in the continuous process of product innovations and productivity improvements like the development of programming software and the use of internet.

c.   Record keeping practices.

The company administrations contain data concerning turnover and the number of hours worked. In some cases these are even divided into projects and/or competence levels. Unfortunately, either the available turnover data or the available hour data does not always tally with the defined observation period used by Statistics Netherlands. To avoid this problem the respondent is requested to fill in the relating turnover and hours worked of projects that clearly correspond to the defined observation period.

The development of response levels over the period from the third quarter 2005 until the first quarter 2007 is shown in figure 1.

Figure 1: Response for Software Consultancy

Source: Statistics Netherlands

4.   Standard classification structure and detail related to the area.

Statistics Netherlands does not distinguish any submarkets within Software Consultancy services (NACE rev.1.1 code 72.22). The distinction that is made is company size, defined by the number of employees in accordance with the Statistics Netherlands strata classification. The companies of the three lowest strata (less than six employees) are excluded from the observation to avoid unproportionately high administrative burdens for these respondents. The technique of Probability Proportional to Size was used for the other strata.

The over-sampling technique is applied to the remaining strata in order to compensate non-response. A relatively high over-sampling factor of three was used for this purpose. The over-sampling factor is applied per stratum up to a natural limit for the sample in the concerning stratum. During the pilot study we had seen a relatively low response and therefore a high over-sampling factor is being applied. The sample design is further summarized in table 4.

Table 4: Sample design NACE rev.1.1 code 72.22

Statistics Netherlands Strata Class	Number of companies	Number of employees	Number of companies for the panel	Sample
0 – 2	26812	28063	0	0
3	1219	8175	13	39
4	806	10691	16	48
5	373	11035	17	51
6	119	7402	11	33
7	36	4827	7	21
8	31	9201	14	31
9	22	42715	22	22
Total	**29.418**	**122.109**	**100**	**245**

Source: Statistics Netherlands

5. Evaluation of standard vs. definition and market condition.

The IT trade associations prefer the new NACE rev.2 classification over the NACE rev. 1.1. Reasons are unknown.

National Accounts questions the allocation of goods of ISIC rev.3 code 3000 Manufacture of Computers and Other Information Processing Equipment in a service code. Presently, it is at least partially included in the ISIC rev.4 code 6209.

6. National account concepts and measurement issues.

The National Accounts department within Statistics Netherlands is currently investigating the usefulness of all SPPIs for deflation purposes. The investigation concerns the plausibility, the coverage and the timeliness of the index. The PPI of Software Consultancy services has been evaluated by the National Accounts with the following results:

1. To test the **plausibility** of the results, the National Accounts compared the PPI development of Software Consultancy services with data from trade associations. Two potentially opposite developments are largely determinant in the price development of Software Consultancy services. Firstly, the level of demand for Software Consultancy services, led by the general economic development, allows prices to go up during buoyant times. Secondly, prices are pressed down by cost efficiency outsourcings into low-wage countries, like India. The pricing method charge-out rates does not take off-shored hours into account. Since the second half of 2005 the Dutch economy grew strongly, while off-shoring

was increasing. The results of the assessment made by the National Accounts are shown in figure 2. Even with these contrary developments, prices increased on average 0.7% quarterly and 2.7% annually and these developments have been deemed plausible. Using *hours delivered to the customer* as the price determining characteristic has been deemed sufficient for the pricing method by the National Accounts. However, there remain reservations concerning productivity that are not accounted for with this method, seen that price and productivity developments are measured as one with this method.

Figure 2: Producer Price Index of Software Consultancy services
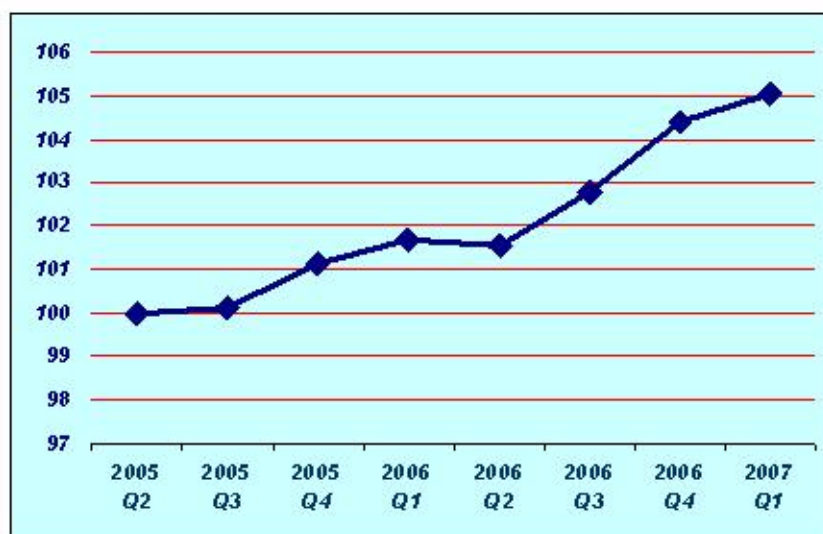
Source: Statistics Netherlands

2. The **coverage** of the chosen range of services or companies of the PPI in relation to the National Accounts classification has been found to be adequate. This is evident by the fact that the old NACE rev.1.1 code 72 matches significantly with the NA classification. The companies and/or services that have been included

within this classification, in accordance with the National Accounts, are shown in table 5. The European Union Short Term Statistics Regulation requires SPPIs for NACE rev.1.1 code 72 on a three digit level. National Accounts assessed the (preliminary) imputation of NACE rev.1.1 code 72 on three digit level by the PPI for Software Consultancy services (72.22) to be a good choice until the new NACE rev.2 comes into force. Since June 2007 Statistics Netherlands is developing PPIs for Computer Programming, Consultancy And Related Activities and for Data processing, Hosting And Related Activities; Web Portals (NACE rev.2 codes 62 and 63.1).

3. The schedule of the SPPI data collection index calculation relates to the **timeliness** within which the SPPI can be estimated. The current schedule requires a publication of preliminary figures 100 days after the end of the quarter. The National Accounts require that the definite figures on volume development are estimated within 75 days after an observation period has ended. In general questionnaires can be sent out to respondents in two different batches depending on the pricing method the questionnaire applies to. The point of time method questionnaires are sent out at mid-quarter and the ex-post period method questionnaires at the beginning of the following quarter. Seen that hourly charge-out rates have been chosen and that the corresponding questionnaires relate to the ex-post period method, the questionnaires are sent out at the beginning of the following quarter. Unfortunately the 75 days requirement can not be met under this schedule (bearing in mind the procedures of reminders). For this reason Statistics Netherlands is planning to reorganize the schedule.

Table 5: In- and excluded companies and / or services for the Software Consultancy services index

Issue for the in- or exclusion of companies and / or services	Accepted for the population /sample
IT company: A company in the SBI 722.2 (SN company register code (Dutch NACE classification)): Development and production of tailor-made software; software consultancy.	Yes
SBI 722.2 Analysis, design and programming of systems, application service providing, interims system management, system implementation, consultancy; design, programming and management of websites,	Yes, except for: • testing and certification of software (7260) • web hosting (7230) • exploitation of websites and search engines (7240)
Lending of personnel for success-related projects	Yes
Lending of personnel without obliged success	No (7450.2)
Licences for use of systems	No
Outsourcing to IT company	No
Education and training for users	No
Business Consultancy without IT relationship	No (7414.1)
Tailor-made software	Yes
Standaard software	No (7221) (5184)
Hardware	No (7210)
Administration is insufficient - if no hours worked for clients are not registered separately (issue for smaller firms) - if hours worked are locally registered or registered per project, it is time-consuming to derive data from the administration - if services are delivered to a parent or daughter company, by internal standard prices market prices are not available - if hours does not play a major role for the price mechanism	No

Source: Statistics Netherlands

7.   Pricing method(s) and criteria of choosing pricing methods.

The chosen pricing method is a unit-value type of hourly charge-out rates. Many respondents have the ability to split turnover and hours worked into rank or competence or experience level. If respondents had problems splitting competence levels over the entire client base, they were as a matter of exception allowed to focus on the largest clients.

Currently Statistics Netherlands is researching the homogeneity, the price mechanism and the pricing unit of measure in selecting the most appropriate pricing method.

1. A pricing method requires an over time *homogeneous* service to be priced.

2. The *price mechanisms* should be compatible with the practicalities of using a pricing method. In the Software Consultancy hours of service rendered is the most important price determining characteristic. Using charge-out rates is compatible with this price mechanism. There are a small number of success-related orders only.

3. The price measurement should take into account all significant price determining characteristics. In other words, is the *pricing unit* a good proxy of the true output. In the case of Software Consultancy contractors and customers often agree to invoice and pay hours delivered. Possibly this is an indication that hours forms the output to be priced.

8.   Quality adjustment methodology.

Quality changes are difficult to adjust in SPPIs where charge-out rates are applied. Four productivity issues for charge-out rates are identified for Software Consultancy Services:

1) The productivity of individual personnel varies, for example due to personnel replacement.

2) Productivity of the company varies, for example due to technical or process changes.

3) The mix of projects or other tasks varies. Therefore the ratio of competence levels needed for these tasks and the corresponding productivity changes.

4) Productivity of projects or other tasks varies due to changes in the composition of the personnel with different productivity levels.

Statistics Netherlands tries to take into account productivity issue number four. The questionnaires ask the respondents to split hours worked and corresponding turnovers into productivity levels per co-worker. The rank, competence, education and experience levels or any combination of these can be used as a proxy to split for different productivity levels. For the Software Sonsultancy index, hours and corresponding turnover are mostly split according to competence levels like seniors, juniors, trainee, etc.

9.   **Evaluation of comparability with turnover/output measures.**

The questionnaires ask the respondents for the turnover relevant to the priced services.

The stratum weights are derived from the annual turnover statistics. This is a structural statistic containing an estimation of the turnover amounts per stratum and submarket.

The actual turnover data for IT services (NACE rev.1.1 code 72) is available in the Statistics Netherlands' general company register on a two digit level only. Therefore the PPI for IT services should relate to the total range of services of NACE code 72 to be compatible with the turnover measure that is likely to be used by the National Accounts. According to the National Accounts the compatibility is not crucially affected if the total NACE rev.1.1 code 72 is imputed by 72.22.

10. Summary.

- Since July 2007 Statistics Netherlands publishes a producer price index for Software Consultancy services (NACE rev.1.1 code 72.2). The majority of the turnover is generated in Other Software Consultancy And Supply (NACE rev.1.1 code 72.22).

- Each observation period is a quarter year.

- A geometric average is used when aggregating the article indices. A Lowe-index is used when aggregating the levels higher than the article index.

- No distinction of submarkets is made. There are sub-indices distinguishing the size of companies.

- The turnover data directly received from companies are used for the company weighting, while estimated turnovers from the Statistics Netherlands annual turnover statistic are used for the weighting of the strata.

- Charge-out rates were chosen as the pricing method on the basis of information extracted from the companies throughout the pilot research duration. The major price determining characteristic is the amount hours worked, which fits well with the chosen pricing method.

- Quality adjustment is made on a case-to-case basis.

Appendix

Comparison actual and future versions of NACE and ISIC for Computer And Related Activities

Future Codes			Actual Codes		
NACE rev.2	ISIC rev.4	Activity Description	NACE rev.1.1	ISIC rev.3	Activity Description
62.01	6201	Computer programming activities	72.21*	7221	Publishing of software
			72.22*	7229	Other software consultancy and supply
			72.40*	7240	Database activities
62.02	6202*	Computer consultancy activities	72.10	7210	Hardware consultancy
			72.22*	7229	Other software consultancy and supply
62.03	6202*	Computer facilities management activities	72.30*	7230	Data processing
62.09	6209	Other information technology and computer service activities	30.02*	3000x	Manufacture of computers and other information processing equipment
			72.22*	7229	Other software consultancy and supply
			72.60	7290	Other computer related activities
63.11	6311	Data processing, hosting and related activities	72.30*	7230	Data processing
			72.40*	7240	Database activities
63.12	6312	Web portals	72.40*	7240	Database activities
*partially					

Source: Eurostat, NACE Rev. 2 structure and correespondences with NACE Rev 1.1 and ISIC Rev. 4

Product classification CPA 2002 version code 72.22.XX

CPA 72.22.xx		Includes	Excludes
11	Systems and technical consulting services	provision of advice and assistance on technical matters related to computer systems: • conducting feasibility studies on the implementation of a system • providing specifications for a database design • providing technical expertise for the integration of hardware and software • providing guidance and assistance during the start-up phase of a new system • providing specifications to secure a database, etc.	– consultancy services in connection with retail sale, classified in 52.48.13 – custom design of software, classified in 72.22.12 – provision of systems analysis and programming services, classified in 72.22.13 – training of personnel on the use of a computer system, classified in 80
12	Custom software development services	– development (analysis, design and programming) of software for, and to meet the requirements of, a specific client – modification of packaged software – web design services	provision of systems analysis and programming services, classified in 72.22.13
13	Systems analysis and programming services	provision of systems analysts' and/or programmers' services on a per diem basis to participate in one of the phases of the development of a system. The client supervises and retains the right to their work	delivery of software commissioned by the client where the developer supervises and is involved in all phases (analysis, design and programming) of the development project, classified in 72.22.12
14	Systems maintenance services	provision of assistance to keep computer systems (software) in good working condition. The maintenance may be corrective or preventive and includes services such as : • testing to detect, locate and rectify faults • improving existing programs • providing up-to-date user manuals • providing advice on the proper use of a system	
15	Other professional computer-related services	provision of computer-related professional services not elsewhere classified: • development of service-level agreements services • disaster recovery services (software) • implementation planning services • quality assurance planning and review services • system implementation support services • system quality assurance services • system integration services	

Source: Eurostat, Statistical Classification of Products by Activity in the European Economic Community, 2002 version

In- and excluded companies and / or services for the Software Consultancy services index

Issue for the in- or exclusion of companies and / or services	Accepted for the population /sample
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SBI 722.2 Analysis, design and programming of systems, application service providing, interims system management, system implementation, consultancy; design, programming and management of websites,	Yes, except: • testing and certification of software (7260) • web hosting (7230) • exploitation of websites and search engines (7240)
Lending of personnel for success-related projects	Yes
Lending of personnel without obliged success	No (7450.2)
Licences for use of systems	No
Outsourcing to IT company	No
Education and training for users	No
Business Consultancy without IT relationship	No (7414.1)
Tailor-made software	Yes
Standaard software	No (7221) (5184)
Hardware	No (7210)
Administration is insufficient - if no hours worked for clients are not registered separately (issue for smaller firms) - if hours worked are locally registered or registered per project, it is time-consuming to extract data out of the administration - if services are delivered to a parent or daughter company, by internal standard prices market prices are not available - if hours does not play a major role for the price mechanism	No

Source: Statistics Netherlands

Price index for Software Consultancy services in The Netherlands

Quarter	Index
2005 Q2	100,0
2005 Q3	100,1
2005 Q4	101,1
2006 Q1	101,7
2006 Q2	101,5
2006 Q3	102,8
2006 Q4	104,4
2007 Q1	105,0

Source: Statistics Netherlands