

SUPPLEMENTARY MEMORANDUM

31-10-2017

Added value of infrastructure to the Dutch economy 1995-2015

This supplementary memorandum belongs to the report of the first study of the added value of infrastructure to the Dutch economy in the period from 1995 to 2015, carried out by Statistics Netherlands (CBS). The study was commissioned by the Next Generation Infrastructures foundation, a knowledge platform of the Directorate General for Public Works and Water Management, ProRail, Port of Rotterdam Authority, Schiphol Group, Alliander and Vitens. The common denominator of these parties is that they manage important sections of the Dutch infrastructure. They exchange knowledge and experience and commission investigations in order to answer common knowledge questions for the benefit of the future infrastructural development in the Netherlands.

An important shared knowledge question is the one about the significance of the Dutch infrastructure to Dutch society. The answer to that question is not available as a matter of course. The present study is a first step, which confines itself to a macroeconomic perspective of the contribution of infrastructure to the Dutch economy. That perspective concerns the direct added value.

Considering that “infrastructure” has not been defined as a sector in the Standard Industrial Classification (SIC), the CBS in this study has tried to construct the infrastructure sector from relevant SIC activities and branches of industry. In consultation with the Next Generation Infrastructures foundation, a demarcation has been decided on which expresses the *functionality* of the immovable infrastructural assets. Infrastructure does not only include dykes, railways, cables and pipelines, but also water safety, energy and water supply, transport of persons, goods and data, telecommunication facilities, and the hygienic discharge and processing of waste and waste water. In short, it concerns basic facilities that are essential for the functioning of society and the economy.

The provision of those basic facilities involves a large number of public and private parties, some of which operate in competitive markets, while others work in the context of a national or regional monopoly. For each of the said basic facilities the chain has been defined from the procurement or extraction of primary raw materials up to the delivery of the basic product or the basic service to end users. In some cases, for instance in the drinking water supply, that chain has been integrated vertically, but in the great majority of cases the basic facility is provided in a concerted action of several parties in different segments of the chain. The government is closely involved in all of these basic facilities, sometimes as the owner and manager, sometimes as a shareholder, but in any case as a supervisory authority *ex ante* or *ex post*, in view of the major public interests involved in these facilities.

In this study it has been attempted to group the whole collection of activities required for the actual provision of the demarcated collection of basic facilities in the virtual infrastructure “sector”.

This cross-infrastructure domain grouping of chains in one sector does justice to the interdependencies and interconnectedness of infrastructural systems. For example, water safety cannot be provided without energy supply, the processing of waste and waste water is closely connected with energy supply, energy supply is impossible without the transport of goods and data, and the transport of persons and goods cannot be realised without energy supply and data traffic. As the physical and digital interconnectedness of infrastructural systems is only increasing (think of the introduction of self-driving electric vehicles and the use of their batteries for the storage of energy from renewable sources), it will be more and more difficult in the future to distinguish separate infrastructural systems and to attribute a certain performance to just one specific infrastructural system.

However, it proves to be anything but simple to make the described *system-of-systems* approach to infrastructure manageable, given the limitations of the SIC classification of the statistical data. The CBS and the Next Generation Infrastructures foundation emphatically welcome reactions to the chosen demarcation of the sector “infrastructure” and to the inevitable assumptions which the CBS has made in this experimental study. Next Generation Infrastructures intends to organise a number of follow-up activities with experts in order to investigate the acceptance of the approach chosen and to improve the method, so that a standard can be created to determine the added value of infrastructure. On the basis of an accepted standard method we can start a longitudinal study. After all, the time series of twenty years in the present study is short in relation to the lifespan of most infrastructural assets.

In international rankings of infrastructural performance, for instance within the framework of the Global Competitiveness Reports of the World Economic Forum and the Digital Economy and Society Index of the European Commission, the Dutch infrastructure features invariably with a very good to excellent performance. The present CBS study shows that infrastructure makes a substantial contribution to the total added value of the Netherlands, amounting to 12 per cent. That comes down to a share of around 10 per cent in the Gross Domestic Product. For lack of an international comparative macroeconomic perspective, however, the study results do not give us any insight into the relative importance of the Dutch infrastructure for the GDP in comparison with other countries. We cannot make that analysis until there is an internationally accepted standard method for the added value of infrastructure, which is also applied in other countries. What we *can* say, though, is that all the other sectors in the Dutch economy are based on the foundation of basic facilities provided for by the infrastructure.

Moreover, it is important to emphasise for the readers of this report and the users of the study results that on the basis of just these study results it is not possible either to draw conclusions about the contribution of infrastructure to economic growth in terms of volume or about the profitability of investments in infrastructure. Also, no account has been taken of indirect effects and *spill overs* from investments in infrastructure, whilst there are many indications that these are considerable. Thus, the CBS has shown earlier that digital infrastructure and ICT capital have a great direct influence on economic productivity and growth, but also indirectly promote them by fostering innovation, competition and internationalisation.^{1,2} Dialogic calculates that the contributions of

¹ CBS (2014). ICT, kennis en economie 2014.

² CBS (2015). ICT and economic growth.

digital infrastructure and ICT capital account for as much as 36 per cent of the economic growth in the period from 1990 to 2013.³ In this context we should be aware that those performances are also thanks to a reliable power supply, and that ICT renders a performance improvement possible in all infrastructural systems.

That the indirect economic effects and the non-economic effects of investments in infrastructure are not discussed in this study, does not imply that these effects are less important. For example, the contributions of clean drinking water and sewerage to public health are of obvious importance to society as a whole. The value of public health is of paramount importance here. That public health has economic value as well is of secondary importance in these cases. Thus, we could give numerous examples of positive - and negative - contributions of infrastructure to the creation of social value. The Next Generation Infrastructures foundation also wants to explore those indirect and non-economic effects in new research projects. By means of the results of that research and the present study of the CBS, Next Generation Infrastructures wants to give substance to a dialogue about the value of infrastructure to society.

The Next Generation Infrastructures foundation intends to continue its cooperation with the CBS, for the purpose of improvement and standardisation of the method to determine the direct added value of infrastructure to the Dutch economy. Therefore I would really welcome your reactions to this experimental study.

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³ Dialogic (2014). De impact van ICT op de Nederlandse economie.