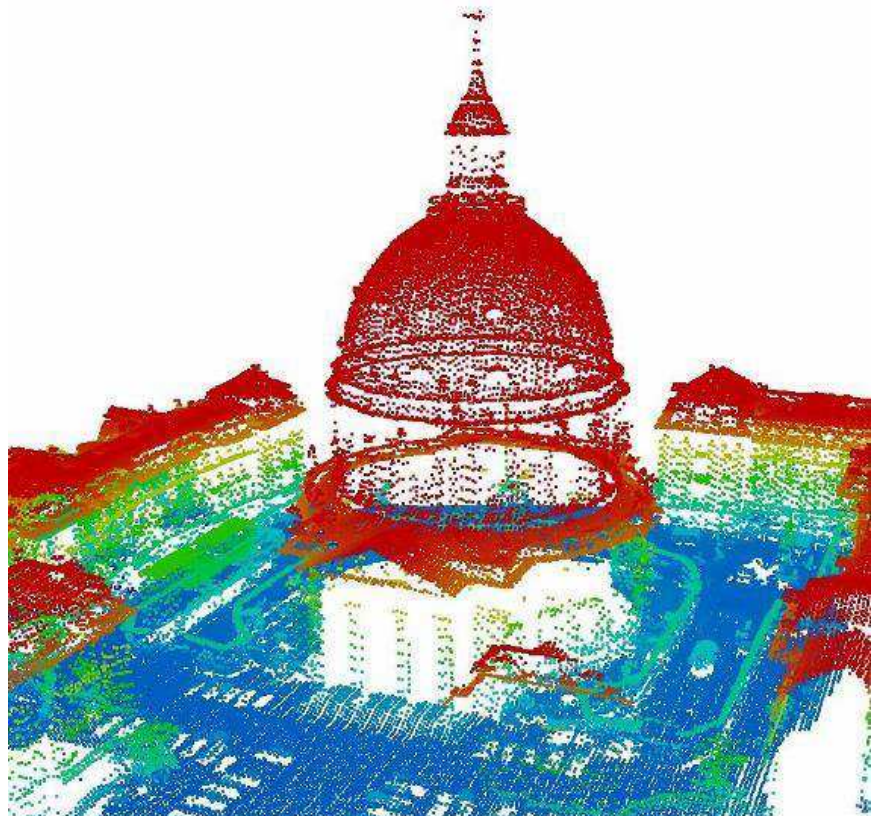

***The impact of the open
geographical data
– follow up study***
Agency for Data Supply and
Efficiency

March 17th 2017



Management summary

In recent years, interest in releasing public-sector data has grown significantly all over the world. Denmark belongs to the group of countries in which the public sector has systematically worked to make public-sector data available. In the new Digital Strategy for 2016-2010, additional focus is given to the potential of public-sector data to support efficiency improvement and drive financial growth and the identification of new business opportunities. The Danish Agency for Data Supply and Efficiency is responsible for the implementation of four initiatives under the primary objective of the strategy to ensure that public digitisation provides optimal growth conditions. This analysis addresses the aforementioned agenda and has been undertaken with a view to discussing the value-generative role of geodata in the public and private sector, including in the utilities sector.

In 2012, the Danish government and KL set up the basic data programme¹ as part of the common public digitisation strategy for 2011-2015. The objective of the programme is to contribute to efficiency improvement, modernisation and improved administration practice in the public sector as well as increased productivity in the private sector. As part of the programme, a large proportion of the data of the then Agency were made publicly available on 1 January 2013. These data are referred to as the open geodata.

The release of public geodata was made in anticipation of this having a positive effect on the economy in the form of increased growth rates and a more efficient task execution in the public sector. The decision to make geodata publicly available was thus based on a positive business case according to which the release would create significant benefits for private enterprises as these enterprises would be able to retrieve public basic data of a high quality following the release. In the business case, a savings potential for public authorities was furthermore indicated in the form of a reduction in e.g. costs for the updating and maintenance of own geodata.

1.1 The main results of the analysis

Initially, the results of the determination of the socio-economic value of geodata will be discussed. Following this, the results of the analysis of the current use of geodata will be discussed. Finally, the potential identified with respect to increased use of geodata – as well as the barriers to such increased use – will be summarised.

1.1.1 The socio-economic value of the open geodata is estimated at c. DKK 3.5 billion in 2016

The data collected in connection with the questionnaire survey and the case studies indicate a significant increase in the use of open geodata from 2012 to 2016.

PwC's calculations, which have been performed by deploying more or less the same method as that deployed during the pre-measurement, show that the open geodata have both a production effect and an efficiency effect. The total socio-economic value of the open geodata in 2016 is estimated at DKK 3.5 billion. The production effect accounts for DKK 2.5 billion of this amount, and the efficiency effect accounts for DKK 1 billion. Please also see Table 1 below. The analysis summarizes the total value of the open geodata in 2016 and shows the development in value from 2012 to 2016. The socio-economic is not to be seen as an annual growth since the geodata were public available.

¹ www.grunddata.dk

The estimate has been produced on the basis of data collected in connection with a questionnaire survey among public authorities and private enterprises, including utility companies.

Table 1: Socio-economic value of the open geodata in 2016 and 2012

DKK in millions	2012	2016
Production effect of the open geodata	1.402	2,542
Private enterprises	116	446
Government agencies	321	373
Municipalities		1,376
Regions	965	151
Independent institutions, etc.		196
Efficiency effect of the open geodata	190	999
Private enterprises	40	726
Utility companies	100	229
Government agencies		22
Municipalities	50	18
Regions		2
Independent institutions, etc.		2
Total socio-economic value of the open geodata	1.592	3,541

Source: The questionnaire survey has been performed among private enterprises, utility companies and public authorities and pre-measurement (2012)

The calculation of the socio-economic value of the open geodata is based on the premise that the open geodata generate a market and efficiency effect. The production effect is generated as a result of both private enterprises and public authorities producing products and services which are based on free access to geodata. When it comes to public authorities, production is computed on the basis of resources used (in the form of personnel). When it comes to private enterprises, the market effect is based on the share of turnover which is attributable to the enterprises having free access to geodata. The analysis shows that the market participants indicate that the market for services based on free access to geodata has increased significantly compared to 2012.

Geodata are used in the production, but also contribute to savings realisation and efficiency improvement in specific work processes in both private enterprises and among public authorities. The efficiency effect is thus an expression of the cost savings which have been obtained through the use of open geodata in private enterprises, utility companies and among public authorities. The efficiency effect is the value of saved time from time-consuming processes – time which is now used for other processes.

Besides the socio-economic value which may be computed as production value in the national economy, the use of open geodata also results in minor welfare gains that cannot be sold in a market. The welfare gains may take the form of improved environmental and health conditions and savings in time for private citizens.

Please note that the results of the analysis are subject to some uncertainty. This is primarily due to the fact that estimates are based on respondents' individual assessments and that it may be difficult to quantify the exact value of the efficiency improvements resulting from the use of open geodata in specific enterprises or

at public authorities. However, we assess that an equal amount of estimates will understate, respectively overstate the actual value.

1.1.2 The analysis relation to the pre-measurement from 2013

In 2013, GST performed a so-called pre-measurement² which estimated the value of the open geodata prior to the release. The pre-measurement represents a point of reference and a basis for comparison with respect to the socio-economic value of the open geodata and indicated a value of c. DKK 1.6 billion. Most of this value was attributable to increased productivity in the public and private sectors. The results of the pre-measurement also showed that geodata form part of the development of new products and services and that geodata provide an opportunity for achieving savings in a number of internal processes. The measurement also indicated that there are a number of barriers to the utilisation of open geodata. On the following pages, the just described measurement will be referred to as simply the “pre-measurement”.

This analysis is based on the results of the pre-measurement. The analysis, however, has been designed to accommodate an ambition consisting of three parts:

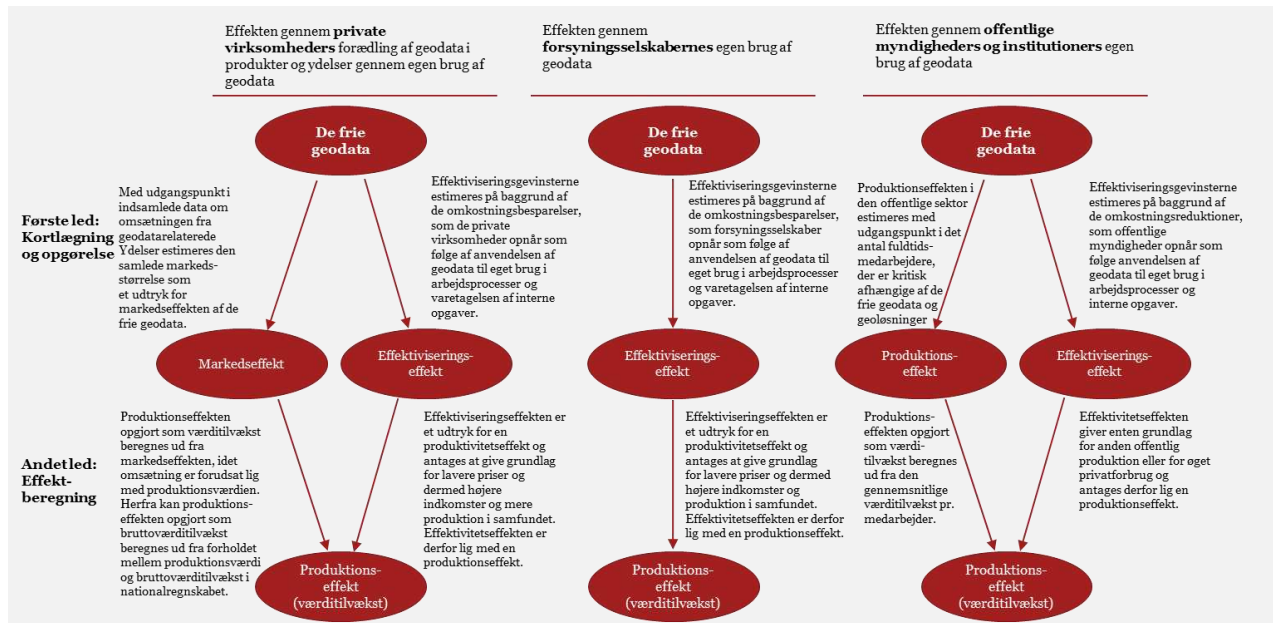
- *Firstly*, the analysis will estimate the socio-economic value of the open geodata as of 2016 and indicate the development in the use of the open geodata since the pre-measurement.
- *Secondly*, the analysis will provide concrete examples of how geodata are currently used by private enterprises, utility companies and public authorities.
- *Thirdly*, the analysis will identify the potential for future use of the open geodata – but also the barriers which are faced by the different groups of users when it comes to realising the potential of the open geodata.

For the first part of the analysis to be successful, PwC will more or less reuse the method developed and used in the pre-measurement to determine the socio-economic value of the geodata. SDFE has expressed a wish for this post-measurement to be conducted using more or less the same method and analysis design as developed and used in the pre-measurement to allow for a high-level comparison. The method used to calculate the value of geodata in connection with the pre-measurement was developed with a view to identifying different players’ use and processing of geodata. The method takes into account the different effects of geodata.

Figure 1 below accounts for the basis of the calculation. A detailed description of the model will not be provided in this section. We refer to section 2 for a walk-through of the model.

Figure 1: Overview of the analysis design from the pre-measurement which has been reused

² ”Effekten af de frie geografiske grunddata”, 2014, Deloitte

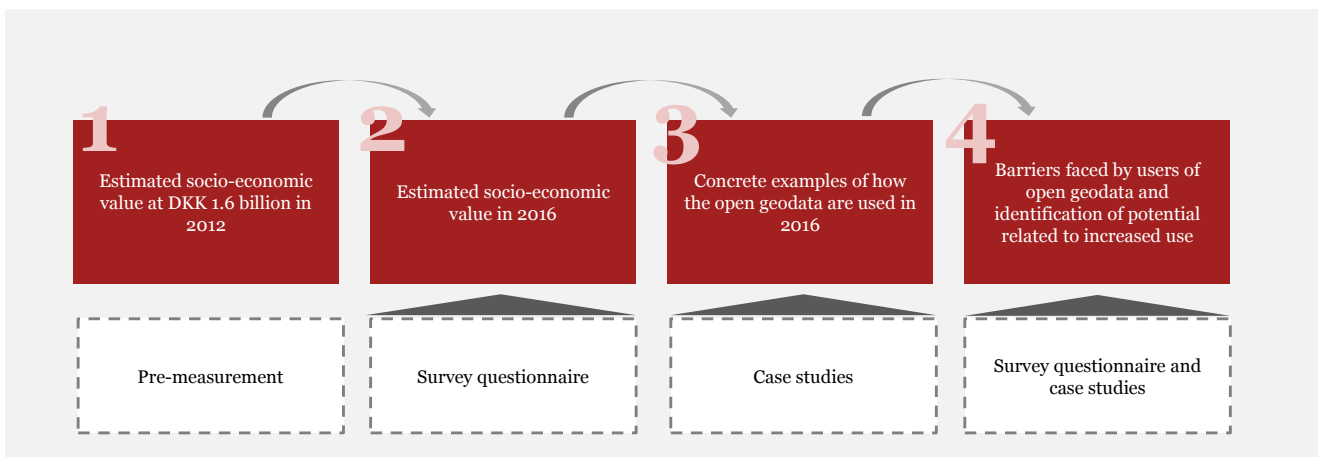


Source: Pre-measurement

When it comes to the second part of the analysis, PwC has performed a number of case studies under which enterprises, utility companies and public authorities using the open geodata have participated in interviews on their use of the data and the perceived value of the data.

The questionnaire surveys and the case studies constitute the foundation for the third part of the analysis. This third part will result in the drafting of suggestions for how to increase the use of the open geodata. Figure 2 below summarises the four steps of the analysis and the data basis.

Figure 2: Summary of the different steps of the analysis and data basis



This post-measurement exercise will thus shed light on the use of the open geodata as of 2016 while at the same time drawing on the results of and establishing links to the pre-measurement. Below, please find a summary of the main results of the analysis.

1.1.3 The open geodata are for example used for climate proofing, industry analyses and facility management

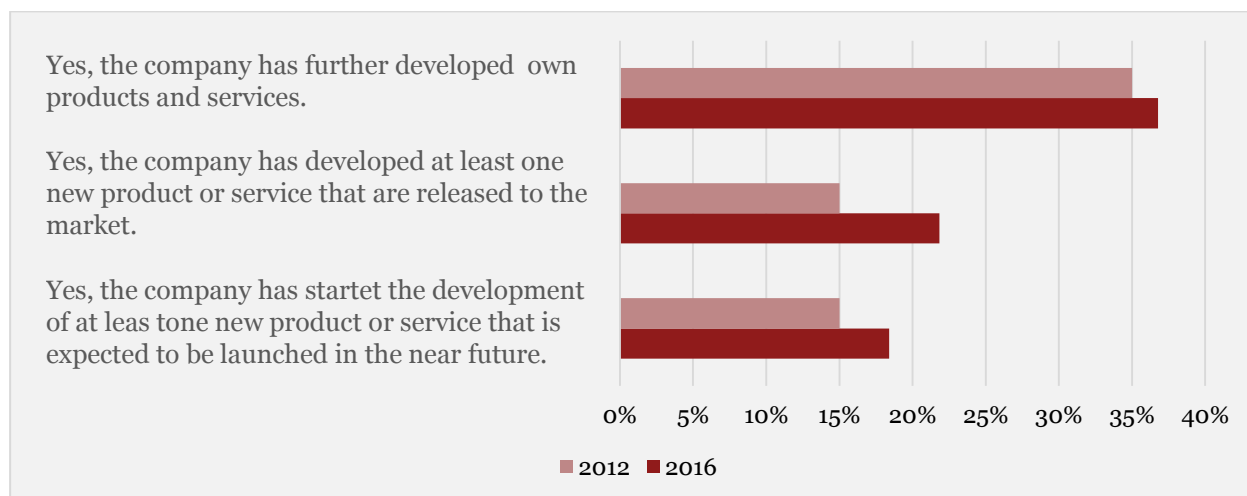
Through interviews conducted in connection with the case studies with a number of private enterprises, utility companies and public authorities, we have obtained clarification of several areas where the open geodata help create value for the users. The first case illustrates how the enterprise Scalgo uses the open geodata, particularly the elevation model, to create a product which utility companies, municipalities and consulting engineering companies use when working with climate proofing. The second case illustrates how the enterprise Bisbase connects the open geodata with the open financial data of the Danish Business Authority and is thus able to create a product which, for example, enables the Nordic bank Nordea to offer its business clients targeted, relevant industry analyses. The third case illustrates how the enterprise Dalux utilises and connects the open geodata with information on properties in the enterprise's facility management solution, thus creating a better overview for its clients of the clients' total property portfolio.

1.1.4 There are advantages connected with an increased use of the open geodata, but there are also barriers that may need to be addressed

The data collected in connection with the questionnaire survey and the case studies indicate that the use of the open geodata stimulates the innovation in the private enterprises that use geodata. The review of the case studies has shown that the open geodata have been a factor in new enterprises being established and have enabled already established enterprises to further develop existing products or develop new products. The participating enterprises also indicated that there are advantages connected with increasing their use of open geodata going forward.

The optimism concerning the future market potential resulting from the use of open geodata may be ascribable to the fact that approx. 20 percent of the enterprises state that they are in the process of developing one or more new products and services which are expected to be marketed in the foreseeable future, cf. Figure 3 below. Further, approx. 35 percent of the enterprises state that they have already further developed one or more products or services as a result of their access to the open geodata.

Figure 3: Percentage of private enterprises that state that the enterprise has further developed own products and services or is in the process of developing new products and services



Source: Questionnaire survey performed among private enterprises and pre-measurement

N: 2016: 87 and 2012: 71

Note: Please note that each enterprise has had the opportunity to provide more than one answer.

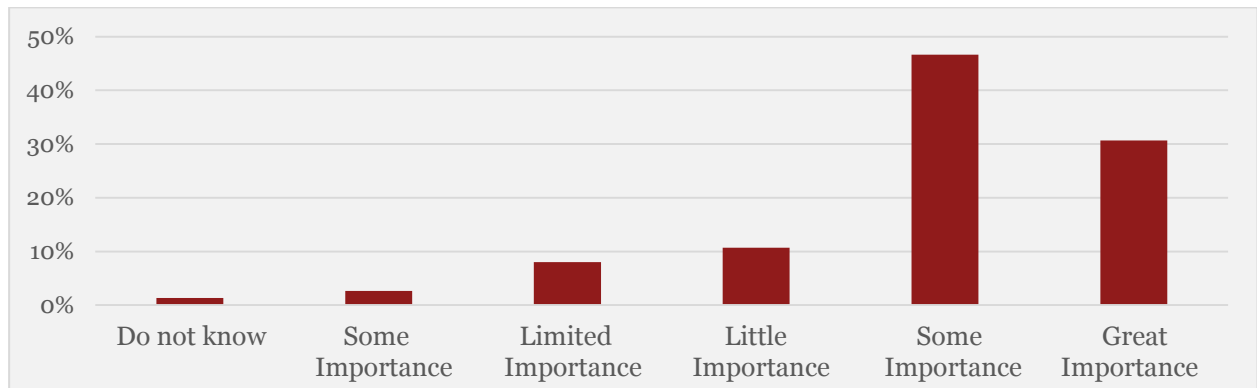
A number of barriers, however, have also been identified, which SDFE and other public players should consider working on overcoming. In relation to the private enterprises, the barriers can be divided into four overall types, namely:

- 1) Technical challenges
- 2) Uncertainty concerning the future market potential
- 3) The geographic reach and quality of the open geodata
- 4) Uncertainty concerning the nature and scope of the role of public authorities

For the public sector, the participating authorities also indicated that there are advantages connected with increasing the use of open geodata going forward. The reason that the public authorities expect that the open geodata may be of significance to the efficiency of the execution of tasks is probably due to the fact that public authorities still see many possibilities for improving the quality of their task performance and also see a potential for increasing efficiency through more efficient working procedures by way of using geodata. Further, it has been assessed that the open geodata still play a significant part in traditional geodata-heavy areas, such as the municipalities' technical and environmental administration units and in the emergency management units. However, there is an emerging potential that the use of open geodata will spill over into new administrative areas and new tasks, such as financial management and management information.

In the questionnaire survey among the public authorities, PwC asked, for example, how important the open geodata will be in relation to the efficiency of the execution of tasks over the coming three-four years. Nearly 80 percent of the survey participants answered that the open geodata will have some or material importance to the efficiency of the execution of tasks, cf. Figure 4 below.

Figure 4: Public authorities' assessment of the importance of the open geodata in relation to the efficiency of execution of tasks over the coming three-four years



Source: Questionnaire survey performed among public authorities

N: 75

For the public authorities, a number of barriers that may hinder an increased use of geodata have also been identified. Said barriers have been identified in relation to lack of competences/experience among the employees and in relation to lack of common themes on the maps, for example as regards streams, roads and properties.