

## IMPLEMENTING INSPIRE IN THE NETHERLANDS

### WDRAŻANIE INSPIRE W HOLANDII

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### **Spatial Data Infrastructure development in the Netherlands**

Over the last few years Spatial Data Infrastructures (SDIs) have become an important issue in Geo-Information Science. Its significance was demonstrated by numerous initiatives all over the world at global, regional, national and local levels. Since the discussion on “spatial data infrastructures” has started in 1991 (Masser, 2007) in just 10 years (until 2001) around 120 countries initiated projects related to establishing SDIs (Crompvoets, Bregt, 2003).

The development of Dutch National SDI (NSDI) dates back to 1990 when RAVI – a network organization for geo-information was established. Initially, RAVI was an official advisory committee on land information of the Ministry of Housing, Spatial Planning and Environment (VROM). In 1993 its status has been changed to an independent consultative body for geo-information comprising representatives of various public sectors. RAVI’s mission with respect to the Dutch NSDI was to organize and promote the provision of geo-information at minimum cost required to perform public tasks. The Ministry of VROM has recognized itself as the formal geo-coordinator. However NSDI initiative has always been left to self-regulation by the GI-sector which has no formal powers to compel public agencies to participate in Dutch NSDI.

In 1992 RAVI presented a structure plan for land information that soon turned out to be a vision of the Dutch NSDI. The vision aimed to stimulate the data exchange of core registers by arranging agreements between authorities. In 1995 several organizations initiated the process of building the Dutch NSDI clearinghouse (NCGI) and in 1996 it was launched on Internet (Bregt, 2000). The process had a bottom-up nature.

The next important step of the Dutch SDI development was the initiation of the “Space for geo-information (RGI) program”. The program officially started in 2003 with a budget of

20 Million Euro. Its mission statement was: *The Enhancement and innovation of the geo-information infrastructure and the geo-knowledge community in The Netherlands towards sound and efficient public administration and a robust business*. As can be seen from the mission the innovation of the national geo-information infrastructure (NGII) played a central role. A large number of projects started with RGI funding to boost the NGII development and innovation. All components of the NGII (spatial data, standards, technology, people and policy) received attention in one or more projects. For instance, one project focused on the innovation and test beds for geo-portals, one project on analyzing GI-access and licensing policy, one project on standards, and another project on the culture of the GI sector and the impact on innovation and data sharing. The “Space for Geo-information” program also triggered a country-wide debate among professionals and policy makers about the vision and future of SDI in the Netherlands (Bregt et al., 2009).

Those developments gave the Netherlands a good knowledge base and a wealth of high-quality geo-data suppliers and services. Nonetheless, several weaknesses had been indentified at that time. For example the Netherlands was eleventh on the list of the twenty-seven European member states, when ranked according to a degree of compliance with the INSPIRE Directive. The most important reason for this mediocre position was the lack of clear national guidelines and coordination, and the consequent fragmentation of geodata. The data were hard to find, the costs of use were relatively high, and the conditions for use varied greatly, and were often restrictive. The researchers concluded that there was no cohesive approach for providing geo-information, and cooperation in the geo-sector was flawed (VROM, 2008). The Ministry of VROM in its responsibility for the coordination and development of geo-information has responded to those weaknesses and the increasing societal importance of the geo-information field by introducing the following policy measures:

- subsidize the Space for Geo-information program,
- establish GI council with strategic advisory duties,
- organize Geonovum – a foundation of public sector parties,
- arrange formal consultation with GI industry, geo-professionals and academia in the framework of Geo-meeting,
- define legal framework and implement various key georegisters.

The above-mentioned activities resulted in an increased commitment in the professional field. It also has resulted in many ambitious and successful projects. However, no uniform strategy plan had been defined yet.

Following the advice from GI-council, the Geonovum and RGI in consultation with parties in the Geo-meeting, have created GIDEON – an approach and implementation strategy for national facility for location-specific information (SDI) (VROM, 2008). This vision was accepted in 2008 by the Dutch Cabinet and Parliament as the vision for the future. GIDEON formulates the following objectives for the Dutch SDI:

- the public and businesses will be able to retrieve and use all relevant geo-information about any location;
- businesses will be able to add economic value to all relevant government-provided geo-information;
- the government will use the information available for each location in its work processes and services;
- the government, businesses, universities and knowledge institutes will collaborate closely on the continuing development and enhancement of the key facility.

Various parties have been working together on GIDEON. Seven implementation strategies have been formulated to realize the GIDEON. It is believed that jointly, these strategies will lead to the creation of a key geo-facility for the Netherlands.

The first GIDEON strategy aims to give geo-information a prominent place within e-services; the second aims to encourage the use of the existing four key geo-registers, and to set up two new ones; the third strategy aims to embed the INSPIRE Directive into Dutch legislation and to implement the technical infrastructure; the fourth strategy aims to optimize supply by forming a government-wide geo-information facility, which is to include geo-data standardization, new infrastructure, and collaborative maintenance; the fifth strategy aims to encourage the use of geo-information in numerous government policy and implementation chains, such as safety, sustainable living environment, mobility, and area development; the sixth strategy aims to create a favorable climate for adding economic value to available public authority geo-information; the seventh strategy aims to encourage collaboration in knowledge, innovation and education, for the permanent development and renewal of the key geo-information facility for The Netherlands (Figure 1).

In the context of INSPIRE implementation, it is interesting to discuss in more detail the third GIDEON strategy. It should be noted that the INSPIRE directive is not the main driver of SDI development in the Netherlands. However, the GIDEON vision sees INSPIRE implementation as one of the crucial strategies to establish well functioning and also well embedded in the European context Dutch SDI (VROM, 2008). The Ministry of VROM aims through INSPIRE implementation to enhance the range, quality and availability of geo-information. The objective of the strategy is to incorporate INSPIRE directive into Dutch legislation by 2011, and create the technical infrastructure in consultation with the professional field.

It is important to stress that the INSPIRE implementation is a much broader task than only the technical infrastructure. Much effort is put on building awareness among stakeholders about the benefits of INSPIRE. It is also important to build a kind of community around INSPIRE so the involved parties will work together in reaching the common goal.

The GIDEON sets up three milestones for INSPIRE implementation: milestone one, to be completed in 2009, aims to complete INSPIRE legislative process; milestone two, to be completed in 2010, aims to make the metadata for spatial data themes from Annexes I and II available; milestone three, to be completed in 2011 aims to link the INSPIRE portal with the national geo-register. The Ministry of VROM is responsible for implementing INSPIRE in the Netherlands. The implementation was designated to Geonovum. The Ministry of VROM has reserved dedicated funds for INSPIRE implementation: 500 000 euro for 2008, 700 000 euro for 2009, and 700 000 euro for 2010. The owners of the source data covered by the INSPIRE annexes would have to cover the expenses of data harmonization and costs related to the INSPIRE directive requirements themselves.

## **INSPIRE implementation**

### **The INSPIRE implementation organization**

Implementing INSPIRE in the Netherlands started in 2007 when the Ministry of VROM designated Geonovum to write so called "Plan of Action" document (Geonovum, 2007). The Plan of Action documents sketched the shape of the Dutch geo-information field during and after INSPIRE implementation. It described the main approaches and activities towards

INSPIRE implementation, indicated the involved organizations, and estimated the resources that would be needed for the process of the directive implementation.

The Ministry of VROM and all the other parties involved see the two main aims of implementing INSPIRE directive in the Netherlands:

- to guarantee that the Netherlands will actively participate in and contribute in the development of the INSPIRE implementing rules and guidelines;
- to implement INSPIRE directive and implementing rules according to the Dutch legal system and within legally prescribed for the implementation period of time.

There are several parties involved in the INSPIRE implementation in the Netherlands:

- The Ministry of VROM – the ministry have the formal responsibility to implement INSPIRE in the Netherlands.
- GI-council – strategic advisory board for The Ministry of VROM.
- Steering committee – is responsible for the overall result of the INSPIRE implementation. The steering committee consists of the representatives of three parties:
  - The Ministry of VROM,
  - Key data providers,
  - Geonovum.
- Stakeholder consultation group – a group comprising representatives of the main stakeholders of the INSPIRE data providers.
- Program office, project teams and working groups – the steering committee has delegated the responsibility for the daily operations on INSPIRE implementation to the program office. The program office is assigned to Geonovum. The head of the program office – the program manager, works with the project managers to assure that program delivers the required results within designated time and budget. Also the knowledge institutes and business sector play an important role in INSPIRE implementation.

The adoption of the INSPIRE directive in the Netherlands has been divided into three phases: preparation, implementation and completion. The preparation phase has mainly concentrated on the planning issues. As a result a program plan for the years 2009 and 2010 had been drawn (Geonovum, 2009c) and some initial activities have started. To complement the program plan several project plans have also been formulated. The project plans are much more detailed than program plans and are yearly updated. The initial activities have also provided some tangible results. For example, an INSPIRE implementation guideline (see section „INSPIRE awareness building”) has been formulated. The aim of this guideline was to help the data providers and other involved organizations to estimate and analyze the impact of INSPIRE within their own organizations. The preparation phase finished in November 2008 when a national INSPIRE congress took place and the program has been started. At that time the Ministry of VROM officially gave “a green light” for the next implementation phase.

The implementation phase consists of three projects: contribution to European and national legislation; implementation facilities; implementation support. The first project concentrates on aligning the INSPIRE implementation rules to the Dutch practice. This is mainly being done by an active participation and contribution of the Dutch organizations to the process of developing and formulating the INSPIRE implementation rules. By doing so, the best possible alignment of the Dutch standards to the INSPIRE directive requirements can be expected. The second project – implementation facilities – concentrates on making geo-information available and used. INSPIRE directive advises (not compulsory) to set up a national INSPIRE portal where

the national geo-information are made discoverable and usable also to the other member states. The Netherlands has chosen to incorporate the INSPIRE portal into the national geo-portal ([www.nationaalgeoregister.nl](http://www.nationaalgeoregister.nl)). For example, the national geo-portal has also a search option only for metadata of the datasets required for specific INSPIRE themes (See Figure 2).

The aim of the third project – implementation support – is to coordinate, stimulate and support the INSPIRE data providers, future users, business sector and standards managers. Those actions assure that INSPIRE rules will be implemented within a period determined by law. The project has several elements. For example, it discusses the possible models to enable INSPIRE data providers to make their data compliant with the INSPIRE requirements.

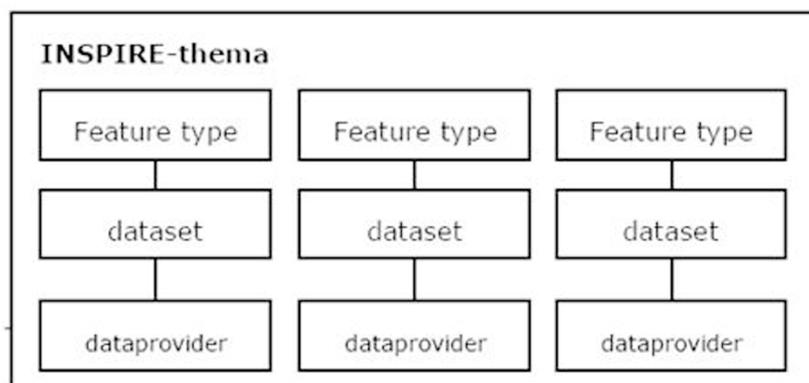
### Models for data-providers

Starting in 2009 all data-providers, whose data according to INSPIRE directive have been considered as compulsory, will have to make them available according to the data specification of the directive. Therefore it was important to make all data-providers aware as soon as possible whether or not their data would be considered as INSPIRE required data. According to the impact assessment studies of INSPIRE directive in the Netherlands (VROM, 2005) around 20 organizations were considered as potential data-providers of the INSPIRE data. Each of these organizations received an official letter from the Ministry of VROM asking them to make the necessary arrangements concerning the requested data.

An INSPIRE theme is usually composed of several feature types. Each feature type can have at least one dataset from at least one data-provider. The data specifications for each theme are not always clear about specific limitation. Therefore depending on how the directive is interpreted the range of possible datasets that potentially can fit the theme description stretches from around 100 to around 5000 datasets. To address the complexity of this task three models of defining the indication of datasets has been proposed and thoroughly discussed: Basic model, Intersection model and Collective model (Geonovum, 2009b).

#### Basic model

In the basic model, for each feature type (e.g. road or border line) of an INSPIRE theme one data provider will be selected per one dataset. In order to be selected, the dataset must fulfil the data specifications of the particular INSPIRE theme. One dataset can also be assigned to any other feature types of an INSPIRE-theme. In a situation when there are more than one dataset suitable for a single feature type, only one dataset will finally be selected as an INSPIRE dataset.



**Figure 3.**  
The Basic model  
for INSPIRE data  
providers

### Intersection model

An intersection model is an extension of the basic model. In this model one main data provider will be selected for the INSPIRE theme. The main data provider will collect the datasets from the other data providers and will create a reference dataset for the INSPIRE-theme. In that way one organization (main data provider) will be responsible for a specific INSPIRE-theme. It is also expected that in this model the better quality of datasets could be assured due to the clearly defined responsibility of the main data provider for the reference dataset.

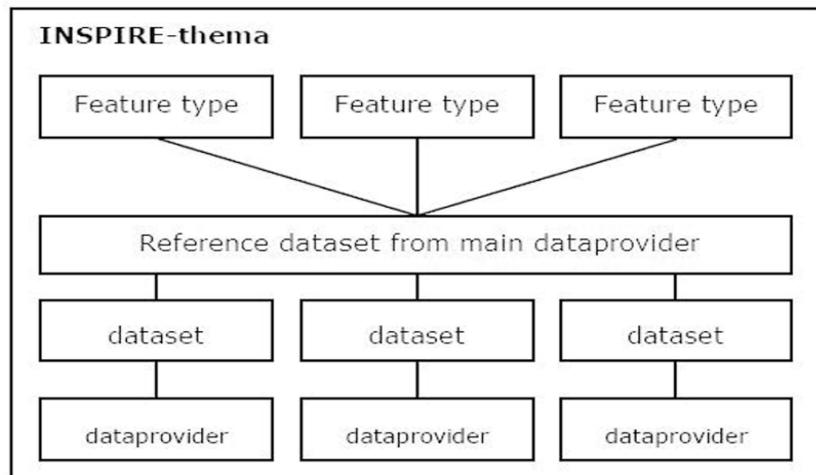


Figure 4. The intersection model for INSPIRE data providers

### Collective model

In a collective model, all data providers that have datasets fulfilling the INSPIRE-theme data requirements, will be identified as INSPIRE data providers. Each INSPIRE data provider will be obliged to deliver datasets conforming to the INSPIRE data specifications and will also be responsible for maintaining those datasets. In this model for each feature type there will be more than one dataset available.

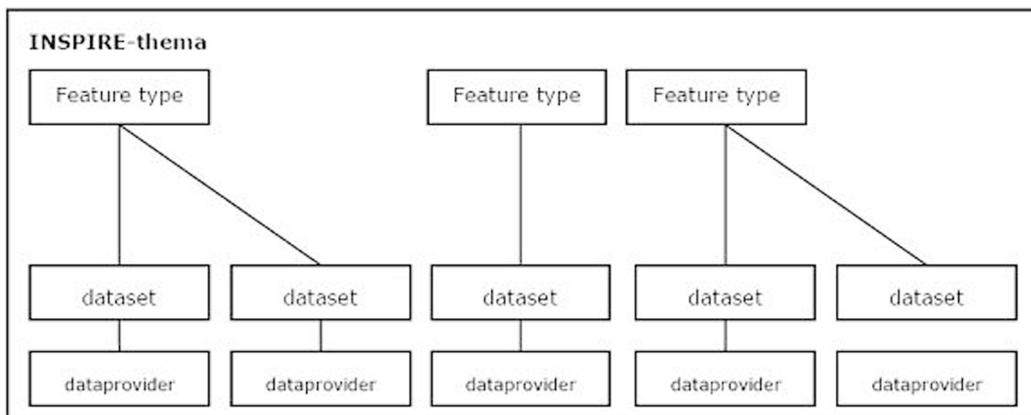


Figure 5. The collective model for INSPIRE data providers

### Analysis of the three models

The rough estimation of the number of datasets potentially fulfilling the data specifications of the INSPIRE themes result in a range of 100 to 5000 datasets. Table 1 shows the range of the number of potential datasets depending on the model.

The number of the potential datasets in all three models is significant. This is due to the fact that many datasets are fragmented between provinces and municipalities and would have to be integrated to provide one dataset of national coverage. It is also estimated that depending on the model, the range of INSPIRE datasets providers would vary between 20 and 500.

Each presented model has advantages and disadvantages concerning its implementation and management. The biggest advantage of the basic model lies in its simplicity. It can be implemented in a rather straightforward manner. On the other hand the management of this model can be troublesome. For example, if the status of an INSPIRE data provider for some reason changed (e.g. political, financial, organizational change), it would have consequences for the dataset identified as an INSPIRE dataset. The implementation and management of the intersection model is more complicated due to the fact that the administration of the reference datasets has to be organized and supervised. However, having one responsible data provider, the communication channel between the Ministry of VROM and the responsible data provider (who is also the central contact point for the INSPIRE theme) is very straightforward. The collective model is the most complicated one. In this model the INSPIRE data providers are not explicitly identified. Therefore it is difficult to assure that those who deliver INSPIRE data will follow all the rules of conformity. There is a risk of data delivery that are either redundant or not harmonized according to INSPIRE. Therefore it is recommended to set up for this model dataset quality control measures.

The three models have also been assessed against five criteria that stem from the INSPIRE directive itself. Those criteria are: harmonisation of the data, use of data, implementation costs, and feasibility of the implementation.

One of the main aims of the INSPIRE directive is to harmonize specific datasets and make them available on the European level. Concerning the three models, the intersection model seems to be the most effective for data harmonization. Per each INSPIRE theme, all relevant datasets from various data providers are collected and harmonized into one reference dataset. In the process of creating the reference dataset it is also expected that all the overlaps and redundancies between the datasets will easily be identified. This model makes the various data providers inclined to cooperate to deliver one reference dataset built out of datasets provided by each data provider. This cooperation of various data providers is what the INSPIRE aims to achieve. Concerning the basic model, the comparisons between the datasets will only be made on the stage of selection of the most suitable datasets for the feature type. There is no harmonization made, however the comparisons between the datasets may contribute to data harmonisation stimulation. The collective model stimulates the data harmonization the least because there is no any data comparison done.

The INSPIRE intention is that users will benefit from the available and tailored to their needs datasets. In the intersection model the user gets one dataset per INSPIRE theme

**Table 1.** Number of potential INSPIRE-theme datasets per model (Geonovum, 2009b)

Model	Number of datasets
Basic model	100–1000
Intersection model	100–1000 (for 34 reference datasets)
Collective model	500–5000

accompanied with the metadata covering all feature types. In the basic model, the distinguished feature types in one INSPIRE theme can be offered by appropriate data providers. The user can identify the suitable dataset by analyzing the metadata of the different datasets. In the collective model, due to the potential great number of available datasets per INSPIRE theme and feature type, the user may have difficulty choosing the dataset suitable for her/his needs. Another shortcoming of this model is that after typing in the keyword in the INSPIRE geoportal, the user would get many various dataset providers which makes the choice time consuming and difficult.

The obligations resulting from the INSPIRE directive cost money. The expenses of INSPIRE data providers concern mainly human resources and finances needed for creating metadata, harmonizing data etc. Moreover the organizational costs like coordination, training etc. can also be of concern. The extent of these costs depends on the chosen model. The Basic Model require all INSPIRE data providers to pay expenses related to making their datasets conformant with the INSPIRE requirements. The intersection model is cheaper than the basic model because it only requires data providers to supply their datasets to the main data provider. For the main data provider the costs are however higher than for each data provider in the basic model. In the collective model the costs for the data providers are comparable with the costs in the basic model. However it has to be stressed that this model concerns cooperation of many data providers which requires spatial attention paid to the organizational costs.

The INSPIRE implementation has also to be feasible. Out of the three described models, the basic model seems to be the most feasible. As soon as the INSPIRE data providers are identified, they are expected to deliver their INSPIRE datasets relatively fast. For the intersection model, the feasibility depends on the INSPIRE theme. For example, for the INSPIRE themes for which the Dutch authentic registers will be used, the intersection model seems feasible. For the other themes, it will be very time consuming to get consensus among the potential data providers on the main data provider per theme. The implementation of the collective model is expected to yield high financial burden due to a high number of data providers.

After a period of consultations, workshops and analysis of the advantages and disadvantages of the three models, Geonovum has advised the steering committee to implement the basic model. Additionally, it has also advised that the intersection model should be applied if the consensus among the data providers can be reached.

### **INSPIRE awareness building**

An important aspect of INSPIRE implementation is the awareness building among INSPIRE stakeholders about the impacts of the directive in their own organizations. A guideline for the stakeholders has been prepared (Geonovum, 2009a). In 8 steps procedure the guideline helps the stakeholders to analyze the INSPIRE impact in their organizations.

In step 1 the stakeholder is asked to analyze which INSPIRE theme is connected to his organization. Also the analysis of the stakeholder's role in contributing to the theme is being done and all the other dataset providers for the same theme are here identified. As a result each dataset provider knows who is responsible for the theme. The stakeholder has to define also the INSPIRE implementation deadlines that applies to his organization.

In step 2 the consequences for the strategy and policy of the organization are analyzed. The stakeholder has to answer questions about the consequences of INSPIRE to the clients

of his information. Also the potential changes of the position of the organization with regard to the cooperation with other organizations are discussed.

In step 3 the consequences for the provision of services are identified. For example questions about the opportunities the INSPIRE offers for the improvement of the stakeholders services can here be answered.

In step 4 the consequences to ICT are defined. For example, the impacts of the standards and metadata and data transformations on the existing software, hardware and systems are analyzed. Also other issues such as connection of the national databases to the INSPIRE network and potential changes to the existing ICT architecture are analyzed.

In step 5, the consequences of INSPIRE implementation for people and organizations are defined. In this step it has to be researched if there is enough qualified staff with proper INSPIRE awareness and education available.

The step 6 concentrates on the analysis of the potential relations of the INSPIRE implementation to other information systems. For example the impact of INSPIRE on the existing geo-information systems or connections to the e-government projects have to be analyzed.

In step 7 the costs and benefits of the INSPIRE implementations are analyzed. The analysis should concentrate on the costs related to all the impacts mentioned in steps 1 to 6 e.g. the costs of adjusting the national networks, implementing standards, converting data, collecting data, etc.

In the last 8<sup>th</sup> step, the working methods on INSPIRE implementation has to be defined. Despite the fact that INSPIRE implementation in the Netherlands is the joint effort of many organizations which cooperate with each other, it is also important to think of the INSPIRE implementation methods within each organization and throughout all their organizational levels.

## Conclusions

This paper presents the main activities and issues concerning SDI and INSPIRE implementation in the Netherlands. Those activities may serve as an example or inspiration for the other countries striving to set up SDI and implement INSPIRE directive. Two issues of the Dutch approach to SDI and INSPIRE implementation should be highlighted.

Firstly, the Ministry of VROM and the Dutch geo-community see the INSPIRE implementation as an opportunity to trigger more discussion and enhance activities in the Dutch geo-information field. With this in mind, the INSPIRE implementation is seen rather as a chance than only a formal obligation. In order to make INSPIRE an opportunity for the Dutch geo-information field, the Dutch geo-community has been actively involved in the development of the INSPIRE rules of implementation. There are five Dutch Legally Mandated Organizations (LMOs). Many Dutch organizations play an active role in Spatial Data Interest Communities (SDICs). Dutch experts are also members of the drafting teams Metadata, Data Specifications and Network Services. This active involvement into decision making processes on the EU level is also the key to secure own national interests.

Secondly, the SDI and INSPIRE implementation is treated not only as a technical task. Geonovum stresses e.g. the importance of awareness building among the community about the benefits and chances SDI and INSPIRE offer. Therefore many various parties directly or indirectly has been involved and participated in the discussion about GIDEON and details of

the INSPIRE implementation (e.g. the choice of the most suitable model for data-providers). Consequently, the decisions are based on strong consensus. It is believed that this consensus-based approach will guarantee the long-term sustainability of the Dutch geo-information field.

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### Streszczenie

*Holandia, jak każde z 27 Państw Członkowskich Unii Europejskiej, zobowiązana jest do wdrażania dyrektywy INSPIRE ustanawiającej infrastrukturę informacji przestrzennej w Europie. W 2008 roku został przyjęty państwowy program budowy holenderskiej infrastruktury informacji przestrzennej (SDI) – GIDEON, który obejmuje siedem strategii. Jedną z nich polega na wdrażaniu dyrektywy INSPIRE.*

*Artykuł przedstawia historię rozwoju koncepcji infrastruktury informacji przestrzennej od początku lat 90. Omówione są najważniejsze etapy w kreowaniu SDI w Holandii. Kluczowym zagadnieniem artykułu jest omówienie i analiza wdrażania dyrektywy INSPIRE w Holandii. Jednostki odpowiedzialne za wdrażanie poszczególnych elementów dyrektywy przyjęły konkretny plan działania oraz kierują się konkretną strategią pracy nad wdrażaniem dyrektywy. Strategia ta opiera się na zaangażowaniu i organizowaniu współpracy wielu podmiotów. Spodziewanym efektem takiego modelu wdrożeniowego jest oparta na konsensusie i wzajemnym zrozumieniu interesów infrastruktura informacji przestrzennej zgodna z zaleceniami INSPIRE. Ponadto, artykuł szczegółowo omawia trzy modele informacyjne na potrzeby dostosowania holenderskich zasobów informacyjnych do wymogów tematów określonych w załącznikach dyrektywy. Wspomniane modele oceniane są również wg kryteriów ekonomicznych, organizacyjnych oraz wynikających z ogólnych celów dyrektywy. Holenderskie doświadczenia mogą być wykorzystane w innych krajach europejskich wdrażających SDI oraz dyrektywę INSPIRE.*

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## Vision

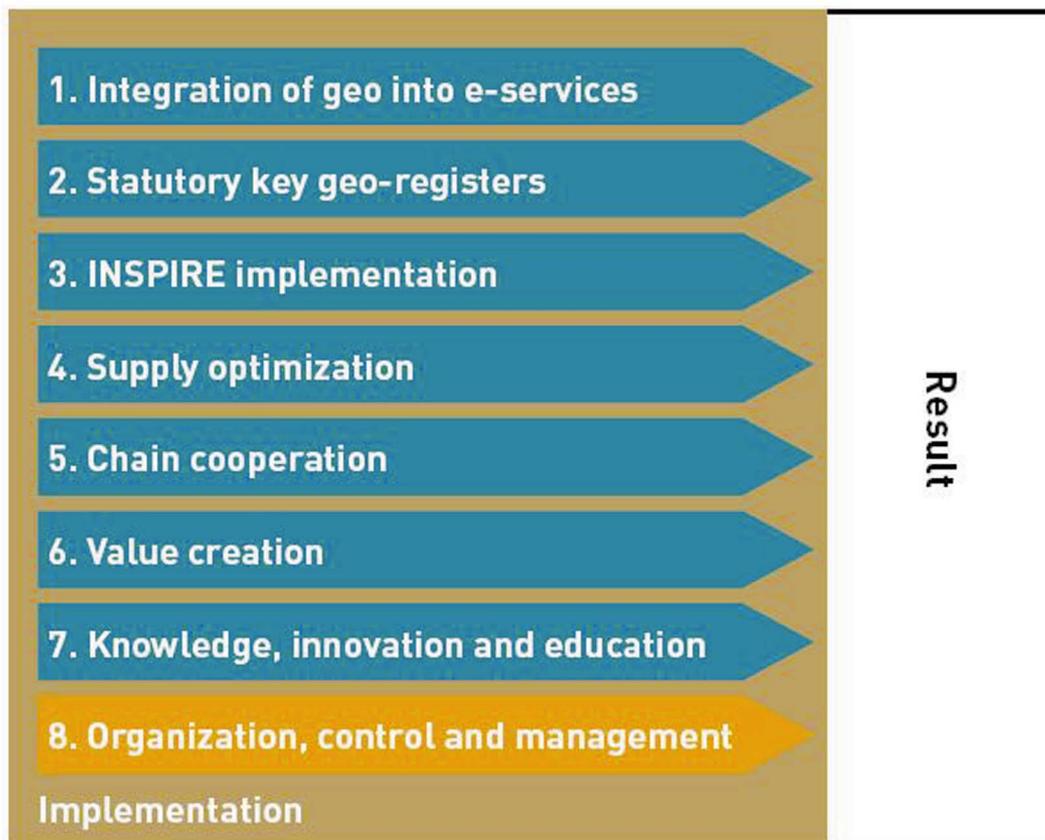


Figure 1. GIDEON strategies (VROM, 2008).

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Figure 2. The Dutch National Georegister.