

Worldwide (Status, Development and) Impact Assessment of Geoportals

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Key words: Impact Assessment, (Catalogue) Geoportals

SUMMARY

At this moment, numerous (catalogue) geoportals have been established and it is expected that many more geoportals will be implemented in the future. To the best of our knowledge, not many status, development and impact assessment studies have been performed with regard to all these initiatives (certainly not on a worldwide scale). It is very important to know what the main developments and impacts of these facilities are to justify all costs, efforts and time to implement these geoportals and to improve their effectiveness and efficiency. For this reason, a survey was undertaken (November 2003 – April 2004) in order to assess the worldwide (status, developments and) impacts. The survey consisted of 21 questions and was sent to all known geoportal coordinators. In total 428 coordinators were contacted.

105 coordinators completed the survey. They were mainly coordinating international, national/federal and state geoportals in Europe, Australia and USA/Canada (only a few were coordinating Caribbean, African and Asian ones). The results were aggregated for the whole world.

The main results are that the implementation of geoportals is a global activity, that the use of geoportals and spatial data will increase, that more services will be provided and new services will be introduced within the next 5 years. As the main drawbacks for implementation are considered: institutional problems, lack of specialized data managers and data standardization. Moreover, it seems that geoportals (of the developed world) have a positive impact on society. These impacts are mainly economic in nature.

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1. INTRODUCTION

Many countries, states and regions throughout the world have spent considerable resources over the past few years debating optimal Spatial Data Infrastructures (SDI). One of the main elements of these infrastructures is the Geoportal (Crompvoets, *et. al.*, 2004). This geoportal is the access network of a SDI on the Internet, which facilitates access to the spatial data and provides complementary services. Maguire and Longley (2005) subdivide geoportals into two groups: catalogue geoportals and application geoportals. Catalogue geoportals are concerned primarily with organizing and managing access to GI. Such geoportal consists of data catalogues, which are publishing, discovery and access systems that use metadata as the target to query spatial data (INSPIRE Architecture and Standards working group, 2002; Maguire and Longley, 2005). Application portals provide on-line, dynamic geographic web services. This paper focuses on catalogue portals. One of the main reasons to build geoportals is to enhance the availability and accessibility of spatial data and the sharing of spatial data and services between suppliers and users.

Based on an overall assessment, the average cost of a geoportal (including services) is around € 1,500,000 a year (INSPIRE Architecture and Standards working group, 2002). This money is spent on management and coordination costs, GIS and Internet application development, training, hardware, network server, standardization activities, legal environment creation, and metadata preparation. Currently, hundreds of geoportals have been implemented. This means that on a global level hundreds of millions are spent yearly for geoportal management. Up to now this amount of money has rarely been audited or evaluated. Moreover, it is expected that many more geoportals will be implemented in the future (Crompvoets and Bregt, 2003, Crompvoets *et. al.*, 2004), which means even more investment.

To the best of our knowledge, no comprehensive and systematic impact assessment study has been performed with regard to all these initiatives (certainly not on a worldwide level). However, it is very important to know what the main (economic, social and environmental) impacts of these facilities are to justify all the costs, efforts and time to establish and maintain these geoportals. For this reason, an extended impact assessment has been performed considering all existing geoportals in the world.

The main intention of this assessment was to analyse the (economic, social and environmental) impacts of geoportals on (GI-)society using several indicators. The final results could be used to make society aware of the strength of geoportals, to enhance the performance, content, usability and maintenance, to improve the data accessibility for

stakeholders (e.g. policy makers) and to persuade politicians of the need of spatial data geoportals.

The methodology used and the main results of this impact assessment are presented in this paper.

2. METHODOLOGY

This paper focuses mainly on the impact of current clearinghouses worldwide. Therefore, it was important to describe the current status and main developments of these facilities in detail first. As point of reference (baseline) to assess the current impact of these clearinghouses, the 'no clearinghouse implementation' was considered. This refers to the situation that no electronic facility on the Internet to access spatial data using metadata exists.

In order to collect information for this impact assessment of geoportals, a survey was undertaken ((November 2003 – April 2004). The survey consisted of 21 questions. This questionnaire was sent to all known geoportal coordinators of existing international, national, federal, state and local (catalogue) geoportals of the world. The inventory of all these existing geoportals was compiled by extensive browsing on the Internet, reading related literature, contacting experts and several webmasters. In total, 428 geoportal coordinators were contacted. Several sources from literature and experts were used to generate the questions of this questionnaire. It was important that as many as possible geoportal coordinators completed this survey to provide a full and proper assessment of the current and potential situation.

This assessment was mainly based on several qualitative economic, social and environmental indicators, because implementation of a quantitative cost-benefit study in monetary terms seemed to be (almost) impossible. Examples of economic indicators were: market transparency, duplication of data collection, and consumption of data and services. Social indicators were: cohesion between citizens, spatial data awareness and (indirect) better-informed decision-making. An example of an environmental indicator is streamline of information supply for environmental policy. The outcome of this survey resulted in qualitative and quantitative data, which could be easily analysed, compared and interpreted.

3. RESULTS

105 geoportal coordinators completed the survey. They mainly represent international, national/federal and state geoportals in Europe, Australia and USA/Canada. Only a few were from the Caribbean, Africa and Asia.

The results are presented according to the type of impact. First, the economic impact will be briefly presented and discussed, using the economic indicators, followed by the social and environmental impacts. Finally, the main drawbacks for geoportal implementation and maintenance are presented and discussed.

3.1 Economic Impact

The following indicators assess the economic impact: market transparency, duplication of data collection, consumption of data and services.

Based on these indicators, it seems that geoportals improve slightly the market transparency and they reduce the duplication of spatial data. Looking from a user perspective, it can be said that these facilities are not often used (70% of them are monthly visited by less than 2000 people). The end users are mainly in the domains of research & developments (universities and public/private institutes), governments & administrations, non governmental organizations, citizens and less in the domains of critical infrastructure providers (transport, health, emergency services, utilities) and commercial & professional end users). Nevertheless, it seems that geoportals improve and increase the use (consumption) of available spatial data partly based on the better facility to access spatial data. Moreover, the range of types of spatial data users widens. Looking from data supply perspective, it could be said that geoportals improve the spatial data sharing and distribution. This means that the supply of spatial data increases when geoportals are implemented. The main data suppliers that disseminate their products via this facility are mapping agencies, geological surveys, environmental protection agencies, local authorities and cadastral agencies. At this moment, geoportals are mainly used for services as: publishing metadata and data, discovery and delivery of spatial data. Only a few geoportals facilitate services to view, to analyse and/or to support e-business for value-adding products and services. It seems that geoportals increase the use and the development of these types of web services.

Based on these economic indicators, it can be concluded that the main economic impacts of geoportals is the increased consumption of available spatial data and services. Both, data users and suppliers, gain economically by the use of geoportals. Data users benefit from the improved efficiency to access spatial data and data suppliers of the increased supply of spatial data. It seems that the implementation and maintenance costs of these facilities are economic beneficial, although the cost savings are marginal.

3.2 Social Impact

The following indicators were used to assess the social impact: cohesion between citizens, spatial data awareness and (indirect) better-informed decision-making

The survey respondents feel that geoportals have a reasonable positive impact on the cohesion between the citizens for the geoportal-related area. In other words, it seems that geoportals strengthen the solidarity and cohesion between people within state, country or international region. The improved spatial data awareness can be considered as the main social impact of geoportals. It seems that geoportals are good facilities to make society aware of the power of spatial data and data sharing. Based on this awareness improvement, it seems that geoportals change (slightly) the way society is using these spatial data. For example, in

many decision-making processes you see the increased role of spatial data. Geoportals improve (indirectly) these processes in a way that more stakeholders become better informed.

Based on the use of these social indicators, it can be concluded that geoportals have a positive social impact. However, the impact is not as high as the economic impact. The main social impact is the improved awareness of spatial data. Additionally, geoportals strengthen the cohesion between citizens within state, country or international region and improve (indirectly) better-informed decision-making.

3.3 Environmental Impact

The following indicator assesses the environmental impact: streamline of information supply for environmental policy.

The survey respondents feel that geoportals have no impact on the streamline information supply for environmental policy. This means also that these facilities have almost no (positive or negative) impact on the environment.

3.4 Drawbacks for Implementation

From the survey not one single factor can be extracted as the main drawback for geoportal implementations and maintenance. Institutional problems, lack of specialised data managers and data standardisation can be considered as the main ones. None of these drawbacks are (directly) technology-related in nature! The no harmonised reference systems, liability problems and inadequate Internet bandwidth are not considered as a drawback for geoportal implementation.

4. CONCLUSIONS

Based on the results of undertaken survey, it can be concluded that geoportals (of the developed world) have positive impacts on society! The impacts are mainly economic in nature. The main economic impact of geoportals is the increased consumption of spatial data and services. This higher consumption is the consequence of the more efficient access of spatial data and the higher distribution of spatial data by suppliers. Moreover, geoportals reduce spatial duplication and improve slightly market transparency. The social impact is not as high (positive) as the economic one. As the main social impact, the improved awareness of spatial data (sharing) can be considered. Other social impacts are the strengthening of the cohesion between citizens and the (indirect) improvement of better-informed decision-making. Finally, it seems that geoportals have no impact on the streamline of information supply for environmental policy. So, geoportals have almost no (positive or negative) impact on the environment.

It is expected that the following economic-related developments of geoportals will take place within the next 5 years: increased use of spatial data, more provision of services, introduction

of new services based on current datasets and more access to spatial databases (these developments are presented in order of importance with the first one as the most important). As a social-related development, it is expected that governments will use geoportals more often for policy-making. And finally, as an environment-related development, it is expected that geoportals will be used slightly more for monitoring environmental policy.

ACKNOWLEDGEMENTS

The authors would like to thank Watse Castelein, Michael Gould, Günther Pichler, Paul Smits, Louis Hecht, Marc Vanderhaegen, Hugh Buchanan, Gerda Schennach for their contributions to the generation of the questions of the questionnaire, and the members of the INSPIRE Expert Group and the Permanent Committee on GIS Infrastructure for Asia & Pacific (PCGIAP) to disseminate the questionnaire to potential clearinghouse coordinators. Moreover, the authors gratefully wish to acknowledge the support of all the clearinghouse coordinators in preparation of this paper. Their contributions by answering the numerous questions were crucial for the results of this paper.

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