Worldwide impact assessment of geoportals

Joep Crompvoets and John Stuiver
Wageningen University, Centre for Geo-Information
Wageningen, The Netherlands
joep.crompvoets@wur.nl, john.stuiver@wur.nl

SUMMARY

This paper presents the main results of a worldwide impact assessment of geoportals undertaken during November 2003 – April 2004. At this moment, numerous geoportals have been established around the world. Until now, no extended impact assessment study has been performed to justify all the investments to establish and maintain these geoportals. For this reason, an impact assessment has been performed using several economic, social and environmental indicators. The assessment was mainly based on a questionnaire that was sent to (428) coordinators of (almost) all existing geoportals of the world. The main result is that geoportals have a positive impact on society! These impacts are mainly economic in nature (improved consumption of spatial data/services, and reduced data duplication). The social impact is also positive, although not as positive as the economic one (improved awareness of spatial data sharing). Finally, it seems that geoportals have no impact on the environment.

KEYWORDS: *geoportals, (economic, social and environmental) impact assessment*

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, which facilitates access to the spatial data. Additionally, it provides complementary services, improves the transfer and sharing of spatial data and services between suppliers and users. 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 geo-information. Such geoportals 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 services) for the formulation, implementation and evaluation of policies valid for a specific area.

Based on an overall assessment, the average cost of geoportals (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. Up to now this amount of money has rarely been audited or evaluated.

At this moment, numerous geoportals at various administrative levels have already been established and it is expected that many more geoportals will be implemented in the future (Crompvoets and Bregt, 2003, Crompvoets *et. al.*, 2004). To the best of our knowledge, no extended 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

are to justify all the costs, effort and time to establish and maintain these geoportals. For this reason, an extended impact assessment has been performed considering numerous geoportals of the world.

METHODOLOGY

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 and was sent to numerous geoportal coordinators of existing international, national, federal, state and local geoportals of the world. This inventory was compiled by extensive browsing of the Internet, reading related literature, contacting experts and several geoportal coordinators. In total, 428 geoportal coordinators were contacted. Several sources from literature and experts were used to generate the 21 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.

As already mentioned before, the questionnaire was sent to geoportal coordinators of (almost) all existing geoportals. The choice to focus on geoportal coordinators was that they were relatively easy to be contacted, their intermediate role between data/service suppliers and users, their awareness of the historical, institutional, cultural, legal, economic and technological context, their direct perception to changes and (economic, social and environmental) impacts, and their ability to provide accurate data about their geoportals.

This assessment was mainly based on several economic, social and environmental indicators of sustainable development, because implementation of a quantitative cost-benefit study in monetary terms is (almost) impossible. These indicators used were measurable, suggestive and illustrative (Taylor et al, 1990). They give insight as to how economic and social structure and environment alter when geoportals are implemented. The identification of indicators was based on expert knowledge, literature and direct relevance for geoportals. Examples of economic indicators were market transparency, duplication of data collection, and consumption of data and services. Social indicators were for example cohesion between citizens, spatial data awareness and (indirect) better-informed decision-making. An example of an environmental indicator was streamline of information supply for environmental policy. The outcome of this survey resulted in qualitative and quantitative data, which could be easily analysed and interpreted.

Finally, it was expected that the view of geoportal coordinators was (slightly) biased. For this reason, a short version of the questionnaire was distributed to 75 European representatives of the GI-community (Summer 2004). The Chi square and Fisher exact test (Agresti, 1990) were used to significantly test the differences of the views between these representatives and the European geoportal coordinators.

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 are from the Caribbean, Africa, Latin America and Asia.

The main results are presented according to the type of impact. First, the economic impact will be briefly presented, followed by the social and environmental impacts. Finally, the result of the test related to biased view of coordinators is presented.

Economic impact

The coordinators consider, as the main economic impacts of geoportals, the more efficient access to spatial data, the higher distribution of spatial data, the increased use (consumption) of available spatial data and services, and the reduction of data duplication. These positive economic impacts seem to counterbalance strongly the main negative impact: costs for implementation and

maintenance. 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 and the reduction of data duplication. It seems that the establishment and maintenance costs of these facilities are economic beneficial, although the cost savings (for the coordinators' organisations) are marginal.

Social impact

The coordinators consider that the implementation of geoportals have a positive social impact as well. However, the impact is not as positive as the economic impact. The main social impact is the improved awareness of spatial data. In addition, geoportals seem to strengthen the cohesion between citizens within state, country or international region and improve (indirectly) better-informed decision-making.

Environmental impact

Finally, the coordinators feel that geoportals have no impact on the streamline of information supply for environmental policy. This indicates also that these facilities have almost no (positive or negative) impact on the environment.

Test biased view of coordinators

41 European representatives completed the short version of the questionnaire. The main result of the reactions between these European representatives and the 34 European geoportal coordinators is the very high similarity in response. This could indicate that the coordinators' views are not very biased (at least for the European situation). This justifies partly the choice to focus on geoportal coordinators to assess the impacts.

CONCLUSIONS

Based on undertaken impact assessment, it seems that geoportals (of the developed world) have positive impacts on society! The impacts are mainly economic in nature. The more efficient access to spatial data, the higher distribution of spatial data, the increased use of available data and services reflect somehow the improved (economic) consumption of spatial data and services by the establishment and implementation of geoportals. Additionally, geoportals reduce spatial data duplication and improve slightly market transparency. The social impact is not as positive as the economic one. The main social impact is the improved awareness of spatial data (sharing). 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. This all indicates that the positive impacts seem to counterbalance strongly the main negative impact of costs for geoportal establishment and maintenance. For the next 5 years, it is expected that the use of spatial data will increase, more services will be provided, new services will be introduced and geoportal will be more used by governments for policy-making.

BIBLIOGRAPHY

Agresti, A., 1990, Categorical Data Analysis, Wiley, pp 558.

Crompvoets, J. and A. Bregt, 2003, World status of National Spatial Data Clearinghouses. URISA Journal, Special Issue on Public Participation GIS. **15**, APA I, 43-50.

Crompvoets, J., A. Rajabifard, A. Bregt, I. Williamson, 2004, Assessing the worldwide developments of national spatial data clearinghouses. International Journal of Geographical Information Science, Taylor & Francis, vol. **18**, no. 7, October-november 2004, 665-689.

INSPIRE Architecture and Standards working group, 2002, INSPIRE Architecture and Standards Position Paper. Infrastructure for Spatial Information in Europe. Commission of the

European Communities. http://www.ec-gis.org/inspire/
Maguire, D.J. and P.A. Longley, 2005, The emergence of geoportals and their role in spatial data infrastructures, Computers, Environment and Urban Systems, 29 (2005) 3-14, Elsevier.
Taylor, C, C. Nicholas, B. Hobson and C.C. Goodrich, 1990. Social Assessment: Theory, Process and Techniques, Studies in Resource Management, 7.