

# COMMUNITY BENEFIT OF DIGITAL SPATIAL INFORMATION

T. Bernhardsen

S. Tveitdal

VIAK A/S  
Bendixklev 2  
4800 ARENDAL - Norway

## ABSTRACT

A joint Nordic project is set up for the purpose of computing (quantifying) the community benefit of large-scale digital maps that include associated data, i.e. a computer-based technical information system of spatial data for municipalities.

The main purpose of the project is to develop economic methods for the calculation of the benefit derived from the introduction of digital spatial information system, to work out general information to be used by a switch-over to digital spatial information and to influence on Nordic policy in this area in a constructive manner.

The project is running for 1985 and 1986 and this paper gives the status of the project and our findings so far.

Preliminary results show that the benefit - cost ratio for digital spatial information system lies between 3 and 7.

## BACKGROUND

Municipal engineering is an important branch of social activity, basic to citizen needs, and consuming large economic resources. In the Nordic countries together the expenses involved in the running and maintenance of municipal technical utilities are estimated to more than 15 billion US\$ per year.

The enormous values involved should imply that even modest improvements of effectiveness will be of great economic importance. Exact information about geographical location and status become levels of detail must be computerbased to be easy to handle, and in order to provide information standard and overview for more intelligent and coordinated efforts.

Preliminary investigation in Scandinavia points at a benefit-cost ratio of at least 3 for investing in good analog map system, i.e. each US\$ invested would pay off three US\$. There are reasons to believe that the benefit-cost ratio for digital spatial information is considerably greater than this figure.

#### ECONOMIC CONSIDERATIONS

Economic methods for the calculation of community benefit derived from introducing digital information system have been developed at the Stockholm School of Economic and Business Administration in cooperation with Moereforskning i Norway.

It is often a positive correlation between a change in technology and profitability. Instead of investing more money in an existing system it may be more profitable to change technology. Choosing time, dimensions and levels of ambition is important parameters of decisions in the introduction of digital geographic information system. The speed of change in technology is of crucial importance for the present day value of cost/benefit.

The chosen information system must be flexible in order to meet the users' different demands. At the start one has to concentrate on one simple task. This strategy will lead to the highest economic benefit.

#### RESULTS

The method of quantifying community benefit of spatial information systems is mainly based on information about time saved among the users of products. The data was collected by means of personal interviews with principal users in various public services in the Nordic countries, USA, Canada and Italy. During 1985 approx. 35 comprehensive consumers interviews have been carried out. A considerable quantity of written materials has also been collected.

The following strategy seems to be common when introducing digital systems:

1. Cost/benefit analysis, which is carried out professionally.
2. A pilot study lasting for 1/2 to 1 year.

3. Decision-making, taking into consideration both tangibles and in-tangibles.
4. Conversion of data, has to be carried out with great effort during a short period of time.
5. Operation and benefit period, incl. the development of new applications.

Data conversions are often made internally in the organisations.

It seems to be a common experience that the benefit is not realized until one category of data is fully converted. Preliminary investigations into the collected materials seem to lead to the conclusion that the typical benefit/cost for digital spatial information system lies between 3 and 7. The benefit/cost ratio for a single effort as automation of map production is often estimated to 1, while a fully information system with links to associated data have benefit/cost ratio up to 7.

In all organisations benefits are derived from an external coordination and exchange of information.

Usual areas of application:

Automation of map production, planning, project-making, water, sewage, electricity, gaz, telephone, roads, police, fire, property administration, statistics, public case procedures, marketing, taxation, land administration.

#### THE PRESENT SITUATION WITHIN THE NORDIC COUNTRIES

As a part of the project the present situation within the Nordic countries is registered. The producing of digital maps is today 30 - 50% of the total map production. Digital production of maps in scale 1:500/1:1.000 is regarded as simple.

Digital information systems with associated data are introduced in large towns and in privat utility firms. There are hardly any organisations that proress complete data information system and the activity is still concentrated on producing the data rather than using it.

In the Nordic countries there are many small organisations and there is a great uncovered demand for low-cost graphic work stations.

It is expected that in a period of 5 - 10 years nearly 100% of the map production will be digital and a lot of geographical databases would have been established.