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<b>Short Description:</b>
This task is focussing on the analysis of cost/benefits for the customer using the plan4business platform; according to the market situation and the data quality, the report describes the economic value of spatial data and develops a cost benefit analysis of the platform based on platform development scenarios. The cost/benefit analysis for the customer is based on external interests (society and urban planners, as well as heritage lobby) and internal interests (occupiers and investors). Further criteria such as data protection and data quality are also considered. Also included is a competitor analysis.
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**Preliminary remark**

This report has been elaborated in three steps:

A first version was produced in Month 12, giving a first cost/benefit analysis for the platform. After the 1-year technical review, the Deliverable was updated with a calculation of the costs and benefits based on the Business Model – Progress Report in Month 14. This third version is now including a competitor analysis (Chapter 4.6).

Therefore, this Deliverable reflects the achievements of the step-by-step discussion, which accompanied the platform elaboration process within the project.

## 1. Introduction

Today, urban and regional planning datasets are **not aggregated and not easy to use for business issues**: planning data users are confronted to fragmented data sets, unable to create comparative analysis, monitoring and analysing urban statistics, or developing urban inquiries and projects. Researchers, spatial planners and professionals from the real estate world as well as other disciplines, such as insurance industry, investors, or market-relevant activities related to urban development have a growing stake in such capabilities.

The plan4business project is developing a **web platform**, addressing **urban and regional planning data users, investors and real estate business actors, providing them a full catalogue of up-to-date spatial- and non-spatial data and services on a pan-European level. This platform is based on existing available open as well as commercial data and crowd sourcing methods.**

To be competitive on the business market, this platform will of course have, first, **to offer the data itself in integrated, harmonised and thus ready-to-use form**, but it will also have **to offer rich analysis and visualisation services** via an adapted Application Programming Interface (API) and an interactive web frontend. **Functions offered will have to range from simple statistical analysis to complex trend detection and to 2D/3D representations** (Reference: DoW plan4business, 2012).

### 1.1 Aim and Context of the report

The report will explore the cost/benefits of the platform for the customer, related to the user requirements and the data/services offered: the aim to create a web platform offering urban, regional and territorial harmonised planning datasets and services responding to most requested user needs.

The report will question today's market situation, the data service quality, and the competitors to the plan4business platform on the European market and likewise, internal and external interests of the customers. Reported statements are based on the previous report on user requirement analysis (D3.1) and the Business Model Progress Report Month 14.

These topics constitute the central part of this report; furthermore, the report focuses on the ways of selling and acquiring datasets, discussing the current Open Data initiatives and concluding with the cost/benefit analysis for customers. The question of licenses is developed in the parallel report D3.2.1.

Some questions arising in the relation to the cost-benefits analysis:

1. How can we bring the demand of the users to the market offer and its conditions?
2. How is it possible to develop, from the available data, a sustainable business model, attractive for a large range of business activities?

3. How is it possible to develop an open platform collecting the datasets and offering a complete and easy-to-use platform, accessible to each type of business activity?

These questions accompany the development of the report's plot. There is a substantial amount of geo-data on the market: as long as they are not accessible in an integrated way, their value may be not considered in the future. This is precisely the aim of the plan4business project.

This cost / benefit analysis is based on the current plan4business Business Model, the data collection and the planned services proposed for the platform.

Costs and benefits are presupposed to take into account:

1. State of the art of the plan4business platform
2. Quantitative and qualitative evaluation of potentially interested users
3. Value of the market connected to similar or related services

By deepening and contextualizing the different aspects of the users, the actual and future spatial data market as well as the value of spatial data, it has been possible to develop an outlook on the costs and benefits of the plan4business platform.

Not to forget also the other categories of stakeholders, such as from the Business Intelligence (BI) sector: these are identified in the competitor analysis chapter, as well as their products.

## 1.2 Contents

The Report is structured as follows:

**Chapter 1** gives the introduction to the report.

**Chapter 2** describes the market situation of spatial data and the potential users of the plan4business platform, including the offering of geo-data and geo-data services in the market, market distortions and costs in the use of data. Finally, a comparison with other major EU projects on use and harmonization of geo-data is exposed.

**Chapter 3** focuses on the economic value of the spatial data; it comments on the concept of Value of Information, describes the data quality, and, in relation to this, the data harmonization process. Furthermore, the models for acquiring and selling data, including open data initiatives, are described. Finally, considerations on the cost analysis assessment are described.

**Chapter 4** develops the cost benefit analysis; public and private sectors costs and benefits are highlighted and contextualized in the market of urban and regional development. Cost and benefits for the customer but also for the platform are detailed indicated, an analysis of the platform competitors developed, as well as a



first analysis of service pricing.

Finally, **Chapter 5** is concluding the cost benefit analysis by developing the challenges of the platform related to the previous quantification of the costs and benefits of users and platform.

## 2. Market and Users

As starting point for the Cost/Benefit Analysis (CBA), it is important to understand and follow the actual market situation in which the platform will be installed. This chapter is describing the market of spatial data and geographic information (GI) infrastructure in Europe and worldwide. It focuses also on the users identified in the Deliverable D3.1 in the first phase and the selected users in the Business Model Progress Report.

As a lesson from past plan4business workshops and events, it is evident that the expected level of quality required from the potential users, a central aspect together with the services offered, is important, together with the geo-data “goods”/services offered by the market

### 2.1 Market situation of spatial data

*Where does the spatial data market come from and where does it go?*

As early as 1995, first ideas of an open European spatial data infrastructure started in Europe, motivated by US initiatives (OMB Circular A-16, Circular A-119) decided one year before. The setting up of a European policy framework for Geographic Information (2000) was the result of two years of consultation with a range of stakeholders, finally drafted in 1996. The GI2000 document argued for that *“the major impediments to the widespread and successful use of geographic information in Europe are not technical, but political and organisational. The lack of a European mandate on geographic information is retarding development of joint geographic information strategies which causes unnecessary costs, is stifling new goods and services and is reducing competitiveness”* (DG XIII/E, 1996a, p. 2).

This initiative did not translate into a communication but started the debate in Europe; the first initiative that followed, *“eEurope - An Information Society for All”*, was a high-level political initiative launched in December 1999 with ambitious targets to bring the benefits of the Information Society within reach of all Europeans. It identified ten priority areas to bring Internet access to the reach of all, and developed key applications in the fields of education, health, transport, and access to government information. It was in the context of the chapter on “Government on-line” that actions related to public sector information will be taken forward. In this respect, the Action Plan agreed in June 2000 had targets for making essential public data on-line including environmental and traffic information, and the development of a co-ordinated approach to public sector information.<sup>1</sup>

Later on, and from a data perspective, the “Public Sector Information” (PSI) initiative translated into a mandatory directive in 2003, helping with establishing a business view on the vast public holdings of geo-referenced data. As another example, GISCO, the “GIS for the Commission”, was built by the statistical office Eurostat, but never achieved its ambitious aims. The sectoral initiative “Coordination of Information on the

Environment” (CORINE) was more successful, as well as the “Urban Atlas”, based on CORINE, which is continuously updated and is hoped to become a reference in this field.

It has been demonstrated in several studies and research results that Geographic Information, based on research funding, can become very important for the economic market: analysis of the market position of e.g. “Global Monitoring for Environment and Security” (GMES), known today as COPENICUS, helped to establish a strong European industry position. Several companies, such as Tele Atlas, a Netherlands-based company founded in 1984 delivering digital maps and other dynamic content for navigation and location-based services, including personal and in-car navigation systems, and providing data used in a wide range of mobile and Internet map applications, as well as NavteQ, demonstrated quite impressive.

Latest initiatives, such as the European Digital Agenda starting within the framework of the Europe 2020 Strategy, gave new impulses in this context, including the INSPIRE Directive. This major recent development entered in force in May 2007 had the aim to establish an infrastructure for spatial information in Europe in order to support Community environmental policies, and policies or activities which may have an impact on the environment. INSPIRE is based on the infrastructures for spatial information established and operated by the 27 Member States of the European Union. The Directive addresses 34 spatial data themes needed for environmental applications, with key components specified through technical implementing rules. This makes INSPIRE a unique example of a legislative “regional” approach. Thus INSPIRE is dominated by environmental issues and is depending logically on the DG Environment in the European Commission. As INSPIRE focussed until now on offering and coordinating the infrastructure of spatial information in Europe, it is becoming, since the Istanbul (2012) and the Florence (2013) INSPIRE Conference, important to use this enormous amount of data information in a business way.

Nevertheless, certain voices are arguing more and more that this amount of information could be compared with “*sitting on a goldmine*” (Pablo Vega, European Satellite centre).

According to several studies, including well-known **Gartner’s predictions** in 2011<sup>2</sup>, a shifting role of IT will affect economies, governments, businesses and individuals in the next years of this century. As organizations build plans for the years ahead, IT is challenged by tight scrutiny regarding cost, growth opportunities and risk. All parties expect greater transparency, and meeting this demand requires IT to become more tightly coupled to governance and business control. Gartner’s report highlights an increasingly visible link between technology decisions and outcomes, both economic and societal. The results, risks and opportunities that arise from IT investment decisions are becoming ever more demonstrable and transparent. Only as an example, out of the key findings and the full range of market predictions Gartner predicts, “*By 2015, companies will generate 50% of Web sales via their social presence and mobile applications*”. This gives us the certainty that the plan4business idea and platform, as well as several other IT related projects, may get to hold a central role in the future of the spatial data market.

### *A market with data proliferation*

The data information market grew since 2000 into a remarkable “data proliferation”. In fact, for the data users, the geographical/territorial data market can be compared to an “hypermarket” or a “Kasbah”: it is rich in products, there is almost a solution ready for every planner’s problem, but the adequate solutions are difficult to find and to combine/integrate among them. Solutions likely are generated without having a proper knowledge on how planners and other relevant actors of urban and regional processes interact and operate.

It is actually possible to acquire many products on this market, normally at an affordable price, and to risk using them just once for a specific issue; this means that they do not create scale economies for end users, but determine relevant cost for their processes/projects design.

It is easy to further elaborate how these costs will be charged on communities/public institution (from the neighbourhood scale until the regional or super-regional one) but, moreover, this in-coordination and disharmonization characterizing this market is affecting even the services dealt among private actors: often high costs generated by these “market distortions” stop the initiation of urban/territorial development projects. It simply makes their design and implementation phases longer.

The results of the **Oxera Study**, mandated by Google and published in January 2013<sup>3</sup> (“*What is the economic impact of Geoservices?*”) on the world economy, demonstrate that people are increasingly accessing and using geographic mapping and location-based services (‘Geo services’). In the five largest European economies, 50% of Internet users access maps online and 35% of smartphone users do so on their handsets. Some of the more everyday uses for mapping and location-based services include local governments helping residents find their nearest community services, such as leisure facilities, schools, transport and recycling. Spatial information is also increasingly being used to link consumers and businesses through location-based services, which combine geographic data from a mobile device with maps and other data to help link consumers to local services such as dentists, hairdressers and coffee shops. From an economic perspective, these services help businesses and consumers connect with each other more easily, increasing welfare for consumers by reducing the cost of searching, and increasing competition and choice in many markets.

The Study aimed to quantify the impact of Geo services on the world economy and consumer welfare and divided the impact into 3 categories: **direct effects, consumer effects and wider economic effects**.

**Direct effects** (economic presence or footprint of those companies directly involved in producing Geo services) can be measured in various ways: by the revenues that are generated, by market capitalisation, by gross value added (GVA), or by the jobs involved in producing these services.

The report estimates that the **Geo services sector has a global GVA of \$113 billion (84,63 billion EUR)**. By way of comparison, global GVA is approximately \$70 trillion, suggesting that Geo services account for roughly 0.2% of global gross domestic product (GDP). In comparison to other industries, the global airline industry has a GVA of approximately \$221 billion and the global video games industry a GVA of approximately \$22 billion.

By considering the **consumer effects**, the report shows that Geo services are typically an intermediate good – i.e., they are not **normally valuable themselves, but help consumers engage in other activities**. Thus, the consumer benefit from Geo services is derived from the value to the consumer of the activities they facilitate (e.g., visiting a new destination). Examples of the consumer welfare benefits that Geo services generate include the following:

- Journey time and fuel savings from more efficient navigation - drivers using navigation devices can reduce travel time and fuel consumption on some journeys by optimising their route, reducing the risk of getting lost and, on occasion, by avoiding congestion. This impact could be worth around \$22 billion per year to consumers.

- Educational benefit - Geo services can provide users with an educational value beyond their conventional use in navigation. Geographic information systems can be considered a useful information technology tool for promoting higher-order thinking, decision-making and problem-solving skills. Geo services can also provide individuals with better access to information about the location of countries, cities and places of interest, leading to more informed population. This educational impact could be worth around \$12 billion a year.

And finally, the **wider economic effects** of Geo services (wider economic, or supply-side effects are the effects of a sector that are driven by the use of Geo in the economy, which help to increase overall productivity and potential output) help to drive efficiency gains throughout the economy, because Geo services facilitate the functioning of businesses.. These can be observed in industries such as logistics, where the Global Positioning System (GPS) has been estimated to generate at least \$10 billion in cost savings. Geo services also affect the wider economy by

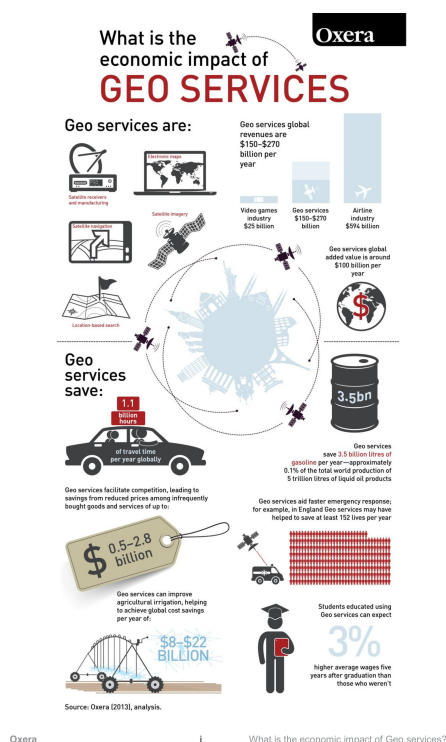


Figure 1: Economic Impact of Geo Services (Oxera 2013)

helping to change the breadth of markets and thereby promote consumer choice. By reducing transport costs and increasing information to consumers, Geo services can broaden both product and geographic markets.

In fact, trying to estimate the size and growth of the European data market is not easy. The findings from the PETIT project, which looked at creating a 1:250k-scale pan-European topographic database were partly based upon the GIBASE study and the findings from a number of private sector organisations<sup>4</sup>. The figures are quite out of date now, being based upon the situation in 1996-98, but they indicated a total European GI data market size estimated at the time to be € 550 Million with an estimated 50% (€275 Million), being supplied via National Mapping Organisations (NMO). Looking at the figures gathered during this key players study may give us some indication of the size of the market in 2002 but the figures for turnover from National Mapping Organisations, for example, can be difficult to interpret – all have different financing models with some being 100% state funded and others being 100% cost recovery. An estimate has to be made for the income received for GI data products. A further complication is that some receive revenue from cadastre and land registration activities so that their overall income does not just reflect data sales (it could be argued that these are GI related services). Taking into account as many of these variables as possible, the overall data income from NMOs in 2002 was approximately €390 Million - but there is probably quite a large margin of error in this figure. If we assume that the figures from 1996-98 were approximately correct, it suggests an overall (and plausible) 42% increase in the NMO market over 5-7 years, which would equate to a **European GI data market of approximately €780 Million**. Totalling the turnover figures for the European key players listed in this report produces a figure **approaching €2.5 Billion** – including all types of GI products and services.

Other reports suggest a European content sector that has a market size of €433 Billion, employing some 4 million Europeans and a value of public sector information in the European Union estimated at around €68 Billion. Other informal estimates suggest that the integrated spatial services market, which includes 'map services' in many forms and ways, is probably in the neighbourhood of €27-35 Billion and growing at about 6% per annum.

And finally, according to a survey on existing findings on the economic impact of public sector information conducted by the European Commission in 2011<sup>5</sup> **the overall direct and indirect economic gains are estimated at €140bn** throughout the EU. The increase in the re-use of PSI generates new businesses and jobs and provides consumers with more choice and more value for money.

In terms of GI market sectors, the report of Daratech 2003<sup>6</sup> suggests "Utilities grew 8% and contributed 51% of total regulated-sector GIS revenues in 2002, while telecommunications companies accounted for 30%. By comparison, transportation accounted for 10%, and education for 8%. Revenues from the public sector - the two major segments being state and local governments, and federal governments - grew by 5% and now account for 30% of total revenue. While federal governments were among the early adopters of GIS

technology, recent trends toward devolving more responsibilities to states and localities have spurred those entities to become important consumers of GIS. In 2002, state and local government markets accounted for 67% of total public sector GIS revenue, while federal governments contributed 33%. The private sector remained flat at 24% of core business. Of the major industry segments within the private sector, earth resources represents the largest opportunity for GIS business, accounting for 43% of total private-sector GIS revenue in 2002. Also notable is the AEC segment, which accounted for 16% of sector revenue. Other significant segments within the private sector include marketing and sales, and cartography” <sup>7</sup>

According to ESRI, whose distributors are active in over 30 vertical markets in Europe, the primary markets are the national, regional and local government sectors which provide about 50% of revenue. Utilities are the second largest sector, with education, military, transport, private businesses as runners up. While Location Based Services have been hailed as a significant breakthrough for the wider expansion of GI services, there is conflicting evidence over how much impact it will have in financial terms. Increasingly, the growth of the GI market is taking place within organisations and by web users, using GI technology and data without recognising it as the traditional compartmentalised GIS of recent decades.

## Summary

Several studies and surveys elaborated both in Europe and United States of America develop with different criteria and consideration aspects the advantages of the GI market; as a summary of the considerations developed above on today’s and future market situation of Geo Services or Geo Information infrastructure in Europe and worldwide, it can be argued that the market has an approximate growth average of 6% worldwide, with an approximate gross value added of 84 billion EUR worldwide.

In Europe, it is expected – according to the European Commission – that **the overall direct and indirect economic gains** are estimated at €140bn. The market is expected to continue to grow in the next years – at least through 2017 - and will include more and more benefits for customers and companies. Innovative technology solutions, industry-specific and regional factors are going to drive future growth in the GIS market, especially by the adoption of mobile GIS for fieldwork, and including the cloud-computing paradigm.

## 2.2 Plan4business platform users

It can be said that the use of GIS in the economy was originated both from the need to put together and maintain (large) spatial databases and from the need for mapping. GIS for business applications can be considered as a tool to support management decisions, as most managers handle data with a geographical dimension. The use of GIS enables managers to demonstrate previously unrecognized (spatial) patterns in their data. The importance of GIS for business applications is obvious: several types of users or customers of the plan4business platform have been identified.



In the Deliverable D3.1 describing the user requirements analysis, the potential users of the platform were classified in **2 sectors: the private and the public sector**.

The following actors of the **private sector** using Spatial Planning and Territorial Data were identified: Spatial Planners, Banks and Insurance industry, Energy and Environmental Services, Health Services, Commercial Services, Real Estate, Telecommunication, Tourism and Travel, Transport and Logistics as well as Security Services. As for the **public sector**, an important partner in the urban and regional planning field, the following actors were identified: Spatial Planning Authorities, Fiscal Authorities, Regional Development Agencies, Other Public Services and Public researchers / Universities.

Further discussions with stakeholders and customers during the last workshops in Vienna and London, as well as Stakeholder Board meetings in Plzen and Warsaw confirmed this selection.

The Business Model developed for the platform (D2.4.1) has put the categories together into one central entity named “Customers and Investors”.

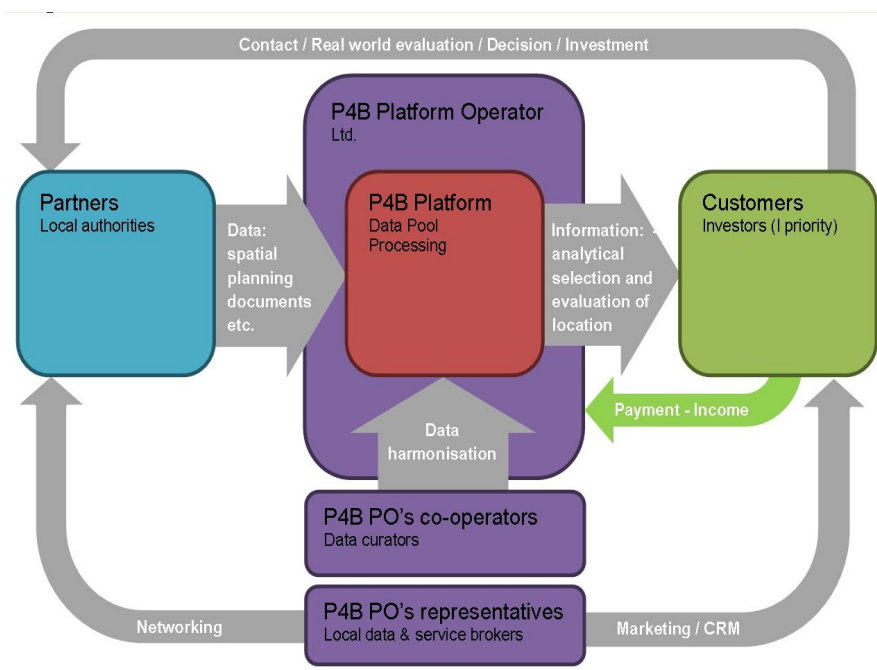


Figure 2: 2-sided Business Model developed for the platform

By developing the user typologies, the following type of planning and business activities directly related to the platform were identified (D3.1):



Type of Actor	Type of Planning / Business Activity
<b>Private Actor</b>	
<b>Planning engineers, spatial planner</b>	Integrated planning discipline including several territorial responsibilities dealing with the development of a territory on different scale levels
<b>Bank / Insurance Services</b>	Planning financial investment related to territorial intervention, financing business urban operations, risk management
<b>Energy / environmental services</b>	Planning sustainable growth, industrial development, solutions for population and environment, local development, long-term development including investment in infrastructures
<b>Health Services</b>	Capacity planning (WHO), integrated in urban planning
<b>Commercial Services</b>	Commerce and Business Services integrated in urban territory
<b>Real Estate</b>	Urban and Regional Development, buying / renting land, building, leasing, Property Deals, Mediation in transaction, information, care-taking, financing, planning, speculation
<b>Telecommunication Services</b>	Applications of information and communication technologies in sectors of health, education, business, governance, the environment and agriculture
<b>Tourism / Travel Services</b>	Leisure Planning important part of urban and regional planning, included in urban development
<b>Transport / Logistics Services</b>	Logistics consider physical urban structure for optimizing companies performance or transport system conditions
<b>Security Services</b>	Services related to company security, geo-location, risk prevention, Geoinformation
<b>Public Actor</b>	
<b>Spatial Planning Authorities / Planning Administrations</b>	Determining policies in national context; supra-regional level responsible for translating guidelines into regional context. Municipalities have power and financial means to develop and implement local policy on spatial planning and the environment – working with business sector (PPP)
<b>Fiscal Authorities</b>	Geo-location of actors, coordination of services
<b>Regional Development Agencies</b>	Urban and regional planning and surveys, development concepts
<b>Other Public Services</b>	Responsible for coordination of services in relation with urban and regional planning, such as energy supply, garbage, etc.
<b>Public researchers / Universities</b>	Research on urban planning, also involving sponsoring of business

Table 1: Deliverable D3.1

At the same time, it is too restrictive to refer to geo-data just looking at geo-marketing related issues. Geo-data and Geo Services are widely used as an ingredient for modelling, analysis, simulation and presentation purposes in many domains. It is widely believed that around 80 to 90 percent of today's digital data has some spatial component or can be linked to existing geo-data<sup>8</sup> (ETHZ, 2010).

By working on the identification of the potential user groups and their **usage scenarios**, the following table could be developed:<sup>9</sup>

Usage Groups	Usage Scenarios
<b>Cartography</b>	<ul style="list-style-type: none"> <li>Producing maps and 3D visualizations</li> <li>Analysing historical maps</li> </ul>
<b>Surveying and Photogrammetry</b>	<ul style="list-style-type: none"> <li>Verify newly acquired data with existing geodata</li> <li>Merge new data into existing data sources</li> <li>Visualizing geodata</li> </ul>
<b>Physical Geography and Geology</b>	<ul style="list-style-type: none"> <li>Producing geologic and geomorphologic maps</li> <li>Analysing the potential of natural hazards</li> <li>Modelling and 3D visualization of terrain surfaces and geologic structures (faults, joints, planes, etc.)</li> <li>Climatic modelling</li> <li>Terrain modelling and analysis</li> <li>Modelling, analysis and visualization of hydrologic systems and water run-off</li> </ul>
<b>Human Geography</b>	<ul style="list-style-type: none"> <li>Producing thematic maps</li> <li>Modelling, analysing, simulating and visualizing socio-economic phenomena</li> <li>Geostatistics</li> </ul>
<b>Urban and Regional Planning</b>	<ul style="list-style-type: none"> <li>Analysing socio-economic phenomena and patterns</li> <li>Modelling and simulating effects of political decisions with a spatial component</li> <li>Visualizing planned changes in landscape and city-scape</li> </ul>
<b>Telecommunication, Supply and Disposal Industry</b>	<ul style="list-style-type: none"> <li>Planning and maintenance of network systems (data lines, sewers, electricity, gas, etc.)</li> </ul>
<b>Medicine</b>	<ul style="list-style-type: none"> <li>Analysing spatial distribution and spreading of diseases</li> </ul>
<b>Botany and Zoology</b>	<ul style="list-style-type: none"> <li>Study the distribution of plants and animals</li> </ul>

<b>Marketing and Financial Services</b>	<ul style="list-style-type: none"> <li>• Geo-Marketing</li> <li>• Optimizing potential store locations</li> <li>• Managing and optimizing advertising locations</li> <li>• Real estate business</li> </ul>
<b>Logistics</b>	<ul style="list-style-type: none"> <li>• Fleet management and route optimization</li> <li>• Car navigation systems</li> </ul>
<b>Leisure Activities</b>	<ul style="list-style-type: none"> <li>• Navigation and routing Services</li> <li>• Planning and documenting leisure time activities</li> </ul>

Table 2: Geodata Usage Groups and Usage Scenarios - Source: ETHZ (2000)

The user groups and usage scenarios above provide us with a qualitative idea of the broadness and articulation of the reference market for the plan4business services. If we move from these categories linked to “field of work” to a more **specific** “urban and regional planners” realm, a figure of about **6.000 business users and 2.000.000 web users** can be estimated **for the plan4business platform**.

In order to define specific values for the business plan, there is a need to provide concrete data for costs and benefit, in order to make an attempt to quantify and describe the users. Proposed here is a heuristic approach in order to provide a clear and quantifiable frame for plan4business potential users. The estimation is based on a survey of the market of information for planners elaborated by report authors and equated with data provided by Eurostat. These presented figures result in a gross appraisal and have good margins of improvement, but they provide a first idea of the market potential.

As an example, regarding exclusively the field of territorial data in Europe three main typologies of users and potential customers can be identified:

Scholars, students and University: there are some associations that may fulfil the function of a European planning forum, but not many which can develop an information source function. The production of information and events is bound, though, to attract most of this audience, quite open-minded and very used to these kinds of media.

Practitioners, investors and planning firms: They are probably highly aware of their necessity for information and especially for new trends and experiences, and their belonging to professional associations clearly does not fulfil this necessity. In the case of attending online events, they can be taken with scholars and students as the clear target audience.

Decision-makers and local authorities: This will be the most difficult market to attract because it is a sector that receives a large amount of information, and most of it is filtered. So the market penetration in this case

will be, when possible, a bit slower, and it will definitely come from the personal contact and the achieved reputation. They would need clear information, e.g. information from the Harmonization Panel of the platform.

In Europe there are several organizers of traditional services in the field of geo-data users, such as:

1. More than a hundred and fifty schools of planning;
2. At least five thousand main local authorities or governmental bodies (out of some 80.000 local authorities of uneven size and importance);
3. About 1.000 major professional planner firms.

### Potential users in detail in the field of territorial / spatial / urban planning

Type	Overall Number
Number of school of planning in Europe	210 <sup>10</sup>
Researchers (architecture town planners)	31.500 <sup>11</sup>
Students (architecture/town planners)	315.000 <sup>12</sup>
Town Planning Students	100.000
Professional town planners in EU	150.000 <sup>13</sup>
Architects in EU	483.000 <sup>14</sup>
Other Professional People with related interests in Town planning	250.000 <sup>15</sup>
Lau 1	8.397
Lau2	121.601
Number of municipalities <sup>16</sup> - Total:	129.998
Governmental policy makers in EU of municipal level	325.000 <sup>17</sup>
Nuts 1	97
Nuts 2	271
Nuts 3	1.303
Numbers of regions in Europe <sup>18</sup> - Total:	1.671
Policy makers at local level in EU	195.000
Policy makers at regional level in EU	35.000
Policy makers at national level in EU	1.000
Governmental policy makers in EU of regional/national level – Total:	231.000 <sup>19</sup>
Third sector and grass root activists	150.000 <sup>20</sup>
Journalists and other people in Media interested in use of geo-data	30.000 <sup>21</sup>
Total estimated in Europe	2.296.500

Rest of the World	2.985.450
Total estimated:	5.281.950

Table 3: Potential users (Source: estimated by report authors based on Eurostat references (2009))

Looking at the figures provided by Table 3, potential users of the platform from the business activity of **territorial services and urban planning only** can be estimated **around 2.300.000 in Europe**, with a clear necessity of planning information and services with value added.

However, two aspects related to this survey may reduce the market potential of the plan4business platform: first, a certain number of users may still not be aware of their need of information, and second, users have identified and are already using other data providers (European professional associations, schools, networks, inter-governmental links, etc.), as it was already stated in the first questionnaire survey (D3.1).

The above diagram, in admitting all limits linked to this quick and heuristic analysis, provides a first snapshot of how relevant the market for plan4business geo-data services is, just referring to the world of town and regional planners. All elements highlighted in this chapter lead to the conclusion that usage groups and scenarios, users and themes linked to this context define a sufficient critical mass for continuing to work and refine the plan4business business model with a committed self-confidence.

### 3 Economic value of Spatial Data

This chapter develops the aspects of the economic value of SDI for the economy. As the plan4business platform data is mainly based on the legal urban spatial planning documents, with products of the European Earth Observation (e.g. GMES) and INSPIRE reference documents, the main benefit of the platform in this context is in **the value of the information (VOI)**.

#### 3.1 Value of Spatial Data

##### The Concept of the Value of Information

Evaluations of the benefits of the plan4business platform to users, policy and decision makers draw from economic concepts regarding the value of information (VOI).

Macauley (2005) provides a useful overview of the concept of VOI. Pointing to studies on the subject, VOI is described as being an outcome of choice, whereby individuals may be willing to pay for information depending on their degree of uncertainty and the opportunities they face. For example, an individual may be willing to pay for additional information if the expected return exceeds the cost of obtaining the information.<sup>22</sup>

Under this framework, VOI is related to:

- The degree of uncertainty faced by decision makers;
- What is at stake in terms of the outcome of their decisions;
- The cost of using the information to make decisions;
- The cost/price of the next-best information substitute.

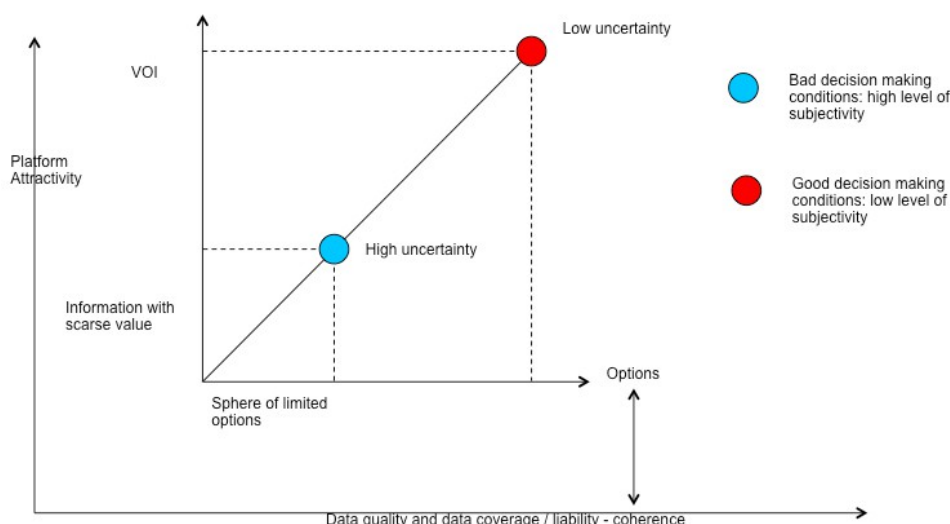
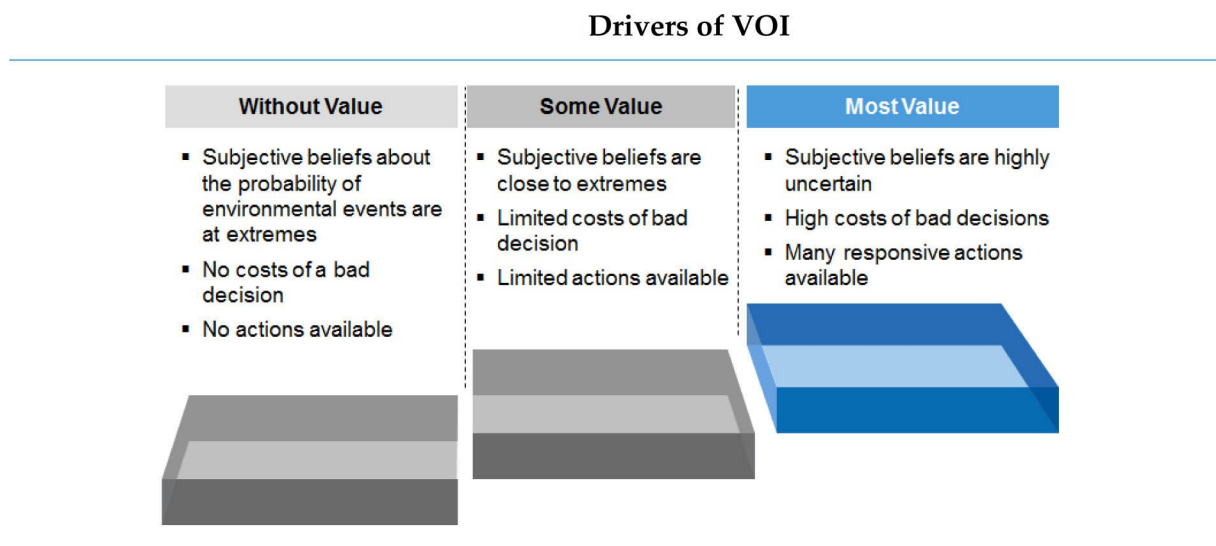


Figure 3: Description of VOI for the plan4business platform (from the authors)

The larger the degree of uncertainty and what is at stake, the larger the information value. However, a high cost of obtaining and using the information and its substitutes tends to reduce VOI. Another important consideration in this context is the ability of individuals to act on the information they receive. If there are limited options available, then the information will have less value. These factors are summarised in the figure below.



Source: Macauley (2005); Booz & Company Analysis.

Figure 4: Drivers of VOI. Source: Macauley; Booz and Company Analysis (2005)

### Quantifying the Value of Information

In valuing information, it is important not to confuse its value with the value of the policies and decisions that information can support. For example, plan4business does not directly provide costs and benefits of an environmental nature; rather it provides information, upon the basis of which people may choose to expend resources to deliver an outcome, which affects the environment.

When new policy initiatives are being founded upon particular information sources, it is easy to mistake the value of the policy initiative for the value of the information source. If one lost that information source, the policy initiative may still be valid, albeit with some loss of precision for having to find other bases for decisions, which in many cases would likely be found. The information source itself is only worth the value of the increase in precision between the two approaches.

Ascribing VOI to plan4business may be complex, and a range of outcomes is likely. In general, it can be expected that the benefits of the platform in terms of the VOI will be incremental. However, this can yield

significant benefits given the role for plan4business in supporting the management of large environmental and security risks.

Regarding the evaluation of VOI for the plan4business platform, the following quote from one of the world's leading economists provides a benchmark for the VOI that can be expected across the various elements of a system like plan4business<sup>23</sup>:

*“All of the studies I know of the value of perfect information find its value to be on the order of one percent of the value of output. For example one study found that if you halve the standard error of precipitation and temperature, say from one percent to one-half percent, or one degree to one-half a degree, you get an improvement in the value of the output on the order of 2 percent of the value of wheat production. A study of cotton gave the same order of magnitude. I have looked at a number of studies in the area of nuclear power and energy, trying to determine the value of knowing whether nuclear power is ever going to pan out. Again, perfect information is worth on the order of one percent of the value of the output.” (Nordhaus)*

In fact, the finding by Nordhaus that better or perfect information is **worth in the order of 1% of the value of the output** has formed the basis of a series of studies that have quantified the impacts across different sectors.

### 3.2 Data quality

The issue of data quality has been mentioned several times during the past plan4business workshops by the customers and stakeholders; it appears as an important factor of attractiveness of the platform and a guaranty of success.

Data are of high quality if they are **fit for their intended uses in operations, decision-making and planning**. Alternatively, the data are deemed of high quality if they correctly represent the real-world construct to which they refer. Apart from these definitions, as data volume increases, the question of internal consistency within data becomes paramount regardless of fitness for use for any external purpose, e.g. a person's age and birth date may conflict within different parts of a database. The first views can often be in disagreement, even about the same set of data used for the same purpose<sup>24</sup>.

Data quality is an essential criterion for the plan4business platform. Customers mentioned several times during workshops and meeting<sup>25</sup>:

*“A concern we encounter frequently is the increasing volume of information that is being required from the private sector by public bodies engaged in various types of evaluation only to discover that much of the evaluation bears little relation to the scope and volume of information submitted. This relates to EIA's, retail assessments etc. Because of the increasing availability of information part of the risk proofing in the process*



*is to request as much of the available information as possible. Some awareness of proportionality in the collection and employment of data needs to be incorporated into the structuring.”*

The following aspect is to be considered as well: *“The **level of confidence of data is essential in order to start business processes**. There is a need to test the confidence (self-reliance) of the result. The pyramid presented in the slides of the plan4business presentation clearly shows how the data complexity is growing at the base (local level), at higher level, data and their representations are more reliable and easier.”*

Looking at quality of geo-data means to approach the information, specifically the territorial and urban one, under various points of view relating to:

- Location data (e.g. relation of spatial “objects” with the environment hosting them)
- Attribute data (e.g. ownership of land-plots, identification of specific planning areas, objects qualities)
- Replication and transferability of data
- Data management
- Management of uncertainties, basically changing objects and areas’ attributes.

This applies to the plan4business platform.

A possibility, which we can try to achieve, would be that the plan4business platform **should offer “Certified Data”**, in a way “Data with reference” or “Checked Data” by the platform.

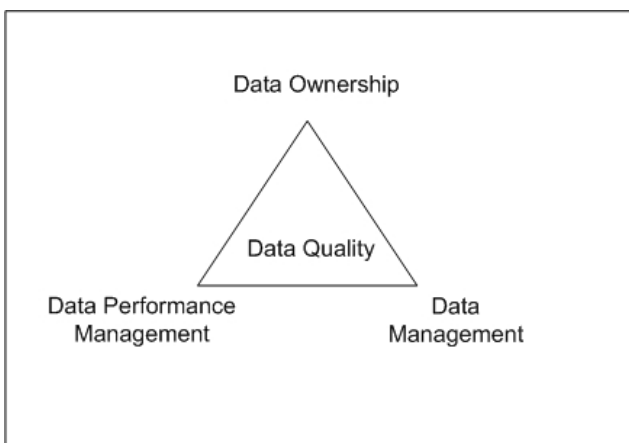


Figure 5: Data quality. Source: Wikipedia

- Data ownership assigns roles and responsibilities to individuals within the organisation to ensure that data quality is continually managed;
- Data performance management implements tools and techniques to give feedback to data owners on the quality of data so that they can manage data;
- Data management offers the data owner with the tools and techniques that will enable them to identify bad data and to correct it.

### 3.3 Need of Data Harmonization in Europe

There is a need today to have data available in the field of spatial planning and SDI (GIS) in Europe harmonized. The term “harmonized” or “harmonization” can easily lead to different interpretations and consequently to misunderstanding of viewpoints.

The data harmonisation process is addressing the homogenization and organization of that initial information, giving it consistency and interoperability. Afterwards, it is possible to create the common data-sharing infrastructure allowing access to harmonized information.

In the context of spatial datasets harmonization, several EU projects developed already this necessity, for example the Plan4all project (reference for plan4business), but also the projects EURADIN, HUMBOLDT, NatureSDIplus and HLANDATA.

**Today, there is a need of harmonizing the current fragmented distribution and properties of geo-data,** at least in order to:

- Trigger a trend of data costs reduction;
- Avoid duplication and conflicts in the set of subsisting data;
- Extract all essential and complete information available for quality geo-referenced applications;
- To facilitate market investments beyond of limited territorial contexts (e.g. regional, national) and provide tools for facilitating the reference markets for companies and institutions providing town and regional planning services/goods;
- To permit to design large scale territorial policies for macro-regions (e.g. EU trans-national/cross border territorial plans and policies);
- To facilitate the comparison of local policies through an easier comprehension of their effects and efficiency, this in order to promote the transfer of best practices.

Geo-data (like other data) is stored according to a certain conceptual view of that part of (geographic) reality that is considered relevant to the business processes within an organization. The purpose of collecting or creating (digitizing) that specific set of geo-data will influence modelling decisions (Kap, Van Leonen, de Vries, 2004). Decision making processes and organizational business procedures are strictly linked to the characterization of data properties.

A good example of Harmonization process is the HUMBOLDT Project, which can be mentioned as a reference for the harmonization process:

*“The main goal of the HUMBOLDT project is to enable organisations to document, publish and harmonise their spatial information. The software tools and processes created will demonstrate the feasibility and advantages of an Infrastructure for Spatial Information in Europe as planned by the INSPIRE initiative,*

meeting at the same time the goals of Global Monitoring for Environment and Security (GMES)” (see [www.esdi-humboldt.eu](http://www.esdi-humboldt.eu)). The idea of having a comprehensive analysis of the existing source data models and of investing effort in defining a target data model that meets the needs of certain application domains is also followed within the HUMBOLDT project. This two-fold approach is best depicted in the following image that was also presented during the INSPIRE 2008 conference in Maribor, Slovenia (GIGER 2008):

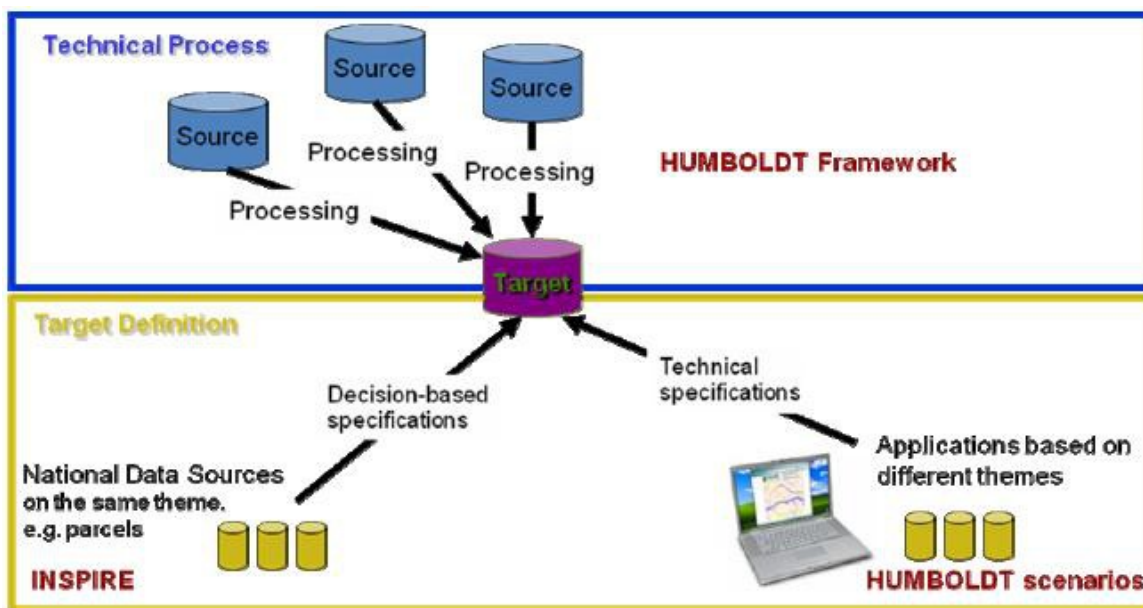


Figure 6: Data harmonisation processes in HUMBOLDT, Source: IGD

The blue frame represents the technical processes necessary to transform data from various sources into a given / defined target. The HUMBOLDT Framework shall support these technical processes by means of various tools and methods. It will be a task within NATURE-SDIplus to test these tools for data harmonisation purposes in case they are available during the runtime of the project. The HUMBOLDT Framework supports the Mediation approach.

The second part of the harmonisation processes can be headlined with the terms “*target definition*”, the prerequisite of which is the profound understanding of the available data sources. There are two ways how to define a target – depending on the respective users need. Option A is to define a target or a common schema for a certain data theme as it happens within INSPIRE and the data specifications for the INSPIRE ANNEX I – III themes. This kind of data model specification is based on decisions (including also political ones). Option B is to define a target model for the certain needs of an application domain. Here relevant data sources need to be combined from a variety of themes and are designed to fit best to the specific application domain. Within HUMBOLDT, the HUMBOLDT scenarios perform this technical process of data specification.

They represent a variety of real-life applications that shall make use of the HUMBOLDT framework in order to meet data harmonisation requirements.

### 3.4 Harmonization process of spatial data

In principle, every spatial object in a spatial data set needs to be described by a data specification specifying the semantics and the characteristics of the types of spatial objects in the data set. The spatial object types provide a classification of the spatial objects and determine among other information the properties that any spatial object may have (thematic, spatial, temporal, a coverage function, etc.) as well as known constraints (e.g. the coordinate reference systems that may be used in spatial data sets). This information is, in principle, captured in an application schema using a conceptual schema language, which is a part of the data specification. As a result, a data specification provides the necessary information to enable and facilitate the interpretation of spatial data by an application. Only spatial data sets that conform to data specifications for Annex themes adopted through INSPIRE Implementing Rules will be considered fully integrated in the European spatial data infrastructure<sup>26</sup>.

It is important to note that the logical schema of the spatial data set may and will often differ from the specification of the spatial object types in the data specification. In this case, and in the context of real-time transformation, a service will transform queries and data between the logical schema of the spatial data set and the published INSPIRE application schema on-the-fly. This transformation can be performed e.g. by the download service offering access to the data set or a separate transformation service.

The Drafting Team "Data Specification" develops the initial drafts that specify the framework for developing the Implementing Rules for the data specifications for the Annex themes. The conceptual modelling framework standardised in the ISO 19100 series of International Standards provides the basis for these developments.

In order to support the interoperability requirements given in the Directive, the data specifications will have to be the result of a harmonisation process based on existing data sets and, where available, requirements from environmental applications.

It is evident that, by connecting the data harmonized to an offer of proper services, market products will be more attractive and useful, beside the question of costs. This translates itself therefore into **positive aspects for the data market**. Geo-data harmonization opens different perspectives in terms of market and governance offers. Looking at harmonisation from the market viewpoint, service prices are evidently one major concern, but benefits are to be found even in the possibility of enlarging markets of players working in urban and regional planning. The perspective of governance is that of better ruling the many big territorial questions still open, especially at EU macro-regional scale (e.g. TEN or ENPI initiatives), but often the

administrative tiers face problems in ruling even relatively small scale issues (metropolitan, sub-regional). Going through harmonisation and structuration of proper services (a) based on harmonised data, b) linked to real practices and c) daily user requirements) it is possible to transform the current data-Kasbah into a data-Outlet, where costs are defined in more transparent ways and goods and services are easy to compare (especially facilitating choice for public institutions in using appropriate tools).

### 3.5 Urban and spatial planning market

The urban planning market is characterized by the fact that most of the clients are basically operating in the public realm: it means they partially follow pure market logics and often have problem of financial resources, being linked to specific rules of spending (e.g. thresholds to respect in using the budget for services, temporal constraints in proceeding with payments, etc.). This kind of customers definitively influences the geo-data market configuration. Moreover, it is to take into consideration that institutional governance threads are basically weak in many EU member states. It means that many institutions dealing with geo-data are not dialoguing among them; this can determine the existence of conflicting data in the same geographic area. Alongside public institutional players, especially at urban/metropolitan scale, larger market forces promote cities investment and determine real estate values. These latter players, in spite of their financial power, are obliged to deal with enforced tools regulating urban planning activities. Town planning tools have different levels of ruling urban market development: simplifying, we can re-conduct them to three main categories<sup>27</sup>:

1. **Indicative** (not binding): the authority that grants building permits is not totally bound by the planning document; it retains a certain discretionary power; however, it must justify why it denies a building permit;
2. **Binding**: a building permit that conforms to regulations cannot be refused; the local authority's discretionary power is highly restricted once the local plan is implemented;
3. **Obligatory**: the landowners are required to build what is set out in the planning document within a defined time period (if they do not, the local authority does).

From previous considerations, we can state that the urban planning market situation is to associate to a sort of hybrid model where private investors' initiatives are defined and contextualized by a set of rules (operating through planning tools) that regulate the use and values of land management. To have a more exhaustive dimension of the urban planning market situation, it is to consider even a set of complementary actors gravitating around urban transformations, which is: researchers, students, politicians, policy makers, opinion makers, grass root activists and so on.

The table presented in the previous chapter (Chapter 2.2, Table 3) can be used as a reference for determining the critical mass of this market: at least to have a first operational, but still rough idea of its potential. It is to consider that these figures are deducted starting from very basic consideration based on the

political geography of Europe, proportions of planning actors in development/requalification urban processes and accounting major universities teaching/researching in urban planning. It is not considered here that potential customers of plan4business services can even be located outside EU borders.

In recent years there has been an upgrading in the use of geospatial information. The data is now basic information that feeds complex smart tools/soft-engines (geospatial information is geospatial data that has been processed or had value added to it by a human or machine process)<sup>28</sup> that permit to offer services in many different fields.

If decision makers are solely looking at statistical charts and tables they are sadly missing out on the famous “gold mine” of geographic information, on which a type of geographic analysis called spatial analysis can be performed to yield trade area information, new customers and competitor area analysis.<sup>29</sup>

Geographic/geospatial information nowadays plays an increasingly important role. In many situations consistent and up-to-date spatial information is crucial (e.g. analysis of the distribution of disease, disaster response systems, and security services). In many cases geographic information is an important input for decision-making processes of governments/governance (urban and regional planning, environmental planning, landscape planning), businesses (banking and financiers), services, facilities management, insurance, media and press, real estate, retail, tourism and so on).

The evolution of GCI (Geospatial Cyber Infrastructures) will produce platforms for geospatial science domains and communities to better conduct research and development and to better collect, access and analyse data, model and simulate phenomena, visualize data and information, and produce knowledge.

To achieve these transformative objectives, *collaborative research and federated developments* are needed for the following reasons:

1. to address social heterogeneity and to identify geospatial problems encountered by relevant sciences and applications,
2. to analyse data for information flows and processing needed to solve the identified problems,
3. to utilize Semantic Web to support building knowledge and semantics into future GCI tools,
4. to develop geospatial middleware to provide functional and intermediate services and support service evolution for stakeholders,
5. to advance citizen-based sciences to reflect the fact that cyberspace is open to the public and citizen participation will be essential,
6. to advance GCI to geospatial cloud computing to implement the transparent and opaque platforms required for addressing fundamental science questions and application problems, and

7. to develop a research and development agenda that addresses these needs with good federation and collaboration across GCI communities, such as government agencies, non-government organizations, industries, academia and the public.<sup>30</sup>

All listed domains create opportunity of small or large scale business activities connected to the exploitation of geo-data thanks to complex, articulated, smart and multi-topic systems.

### 3.6 Models for acquiring and selling data

Investment in the collection, storage and dissemination of publicly available geo-data can potentially lead to high returns. It can be due to several factors, at least:

1. Improved information to attract investors in specific urban areas/territories (increasing capability of generating urban/territorial projects)
2. Increased public institutions ability to propose and negotiate contracts for developing urban/territorial services and infrastructures;

The type and quality of geo-data, their density of coverage, ease of access and price are all significant in the process. The reason is that costs are directly connected to quality, quantity and type of data collected.

The platform provides services generated through elaboration of data, these services answer a precise request generated by the use cases (D. 3.1). This costs/benefits analysis calculates the selling value of p4b outputs making a comparison with current value of main services derived by elaboration of geo-data (see Table 3, Eurostat estimations). Benefits scenarios are derived considering the market share that realistically could be intercepted by this smart system, under very restrictive conditions. Finally, the data-selling model is based on these assumptions:

- Data are not sold in the platform, but services with added value responding to precise use cases
- Services are in prototypical phase; also, their value is estimated through a comparison with market values of similar ones.
- Compared market values are taken under very restrictive condition

As far as data acquisition concerns, the plan4business platform can rely on an incremental method. The platform is concerned with gathering open data, under respect of specific quality criteria (data coverage, accuracy, consistency...), but it has been considered even a model for acquiring data (see fig.12 values). This model for the platform suggests to initially gather a relevant amount of data (covering major urban areas in Europe) and successively increase the data feeding the system with minor amounts, while keeping the guaranties connected to continuous data updating (data liability) and other minor technological issues (domains, servers maintenance...). Costs of acquired data have been even calculated as a percentage of

services market value, but in this case not under restrictive conditions. Finally, the data-acquiring model is based on following assumptions:

- Most of data should be gathered as “open data”;
- Data should be increased incrementally after a first relevant investment conferring data coverage critical mass to the platform;
- Value of data has been related to services market value, with attitude of over estimating costs.

#### *Transformation in time and value-added services*

An additional factor to consider is connected to the transformation in time of information stored in data. Geo-data can represent evolving situations (from past to future) and planners can build upon “data temporal evolution” former territorial/urban situations and future perspectives/transformations.

Connecting the factors a) amount and diversity of geo-data, b) evolution in time of the geo-data and c) combination of geo-data and specific spaces of different territorial scales, it is possible to invent a relevant number of new and innovative services to offer on the market of urban and territorial implements. The services are not just to consider in the field of pure planning solutions (plans, programmes policies, technical projects), but even in other correlated activities such as:

- Providing innovative tools and methods for teaching urban subjects;
- Exhibitions of/on urban transformations (valorisation of cultural heritage connected to evolution and transformation of cities, e.g. cadastre and plans advancement in time);
- Software for managing relations among land use and fiscal policies;
- Devices generating real time planning answers/solutions to urban daily needs (e.g. to find the quickest way for an ambulance in the city in the rush hour);
- Programmes for analysing investment trends and changing behaviours in the real estate market.

### **3.7 Open Data initiatives and related EU directives**

Open data is the idea that certain data should be freely available to everyone to use and republish as they wish, without limiting restrictions from copyright, patents or other mechanisms of control. The goals of the open data movement are similar to those of other "Open" movements such as open source, open hardware, open content and open access. The philosophy behind open data has been long established (for example in the Mertonian tradition of science), but the term "open data" itself is recent, gaining popularity with the rise of the Internet and World Wide Web and, especially, with the launch of open-data government initiatives such as Data.gov.<sup>31</sup>



In early 2013, the European Union Commission unveiled a new Open Data Portal, with over 5,580 data sets – the majority of which come from the Eurostat (the statistical office of the European Union). The portal is the result of the Commission's 'Open Data Strategy for Europe', and will publish data from the European Commission and other bodies of the European Union; it already holds data from the European Environment Agency.

The portal has a SPARQL endpoint to provide linked data, and will also feature applications that use this data. Everyone interested to facilitate reuse, linking and the creation of innovative services can download the published data. This shows the commitment of the Commission to the principles of openness and transparency<sup>32</sup>.

In 2003, the EU adopted the Directive on the re-use of public sector information (PSI Directive). It has introduced a common legislative framework regulating how public sector bodies should make their information available for re-use in order to remove barriers such as discriminatory practices, monopoly markets and a lack of transparency.<sup>33</sup>

The proposal for a revision of the Directive proposes to further open up the market for services based on public-sector information, by:

1. Including new bodies in the scope of application of the Directive such as libraries (including university libraries), museums and archives;
2. Limiting the fees that can be charged by the public authorities at the marginal costs as a rule;
3. Introducing independent oversight over re-use rules in the Member States;
4. Making machine-readable formats for information held by public authorities the norm.

The Union legislator, composed of the European Parliament and the Council, discussed the Directive. In December 2011 the Public sector information (PSI) has started, which today is the single largest source of information in Europe. It is produced and collected by public bodies and includes digital maps, meteorological, legal, traffic, financial, economic and other data. Most of this raw data could be re-used or integrated into new products and services, which we use on a daily basis, such as car navigation systems, weather forecasts, financial and insurance services.

Re-use of public sector information means using it in new ways by adding value to it, combining information from different sources, making mash-ups and new applications, both for commercial and non-commercial purposes. Public sector information has great economic potential. According to a survey on existing findings on the economic impact of public sector information conducted by the European Commission in 2011<sup>34</sup> **the overall direct and indirect economic gains are estimated at €140bn** throughout the EU. The increase in the re-use of PSI generates new businesses and jobs and provides consumers with more choice and more value for money.

And finally, in December 2011, the European Commission launched an Open Data Strategy for Europe, **which is expected to deliver a €40 billion boost** to the EU's economy each year (<http://open-data.europa.eu/>). Europe's public administrations are sitting on a goldmine of unrealised economic potential: the large volumes of information collected by numerous public authorities and services. Member States such as the United Kingdom and France are already demonstrating this value. The strategy to lift performance EU-wide is three-fold: firstly, the Commission will lead by example, opening its vaults of information to the public for free through a new data portal. Secondly, a level playing field for open data across the EU will be established. Finally, these new measures are backed by the €100 million which were granted in 2011-2013 to fund research into improved data-handling technologies.<sup>35</sup>

### 3.8 First conclusions towards a quantified analysis of costs and benefits

It is a challenge to precisely identify the extent to which the information collected by the plan4business platform will contribute to enhancing the understanding of complex spatial planning processes, although it is reasonable to assume that a positive contribution is expected. The pricing system developed for the platform services can have a consequent impact on the consumer behaviour.

As regarding the calculation of the costs and benefits, one method would be to use the conservative assumption of 1% used in other studies, by assuming that the VOI across each plan4business activity area is incremental, and **equal to 1% of output**. This could be recognised as a conservative assumption in this context (see chapter 3.1).

As the plan4business project developed already an overview of services and data collection, it is more reliable to evaluate the costs and the benefits of the platform according to our experience and the business model used: this method was therefore followed for the development of the CBA.

Consequently, the CBA based on the catalogue of services and data collection developed in the business model elaborates an exact evaluation of the costs and benefits for the platform owners and the platform users.

## 4 Cost benefits analysis

This chapter brings together the costs of the platform and the quantification of the benefit areas (customer action fields).

### 4.1 Methodology

The cost/benefits models for a product can be different, according to the product developed.

**A Cost–benefit analysis (CBA)** is a systematic process for calculating and comparing benefits and costs of a project, decision or government policy (hereafter, "project").

The CBA has two purposes:

1. To determine if it is a sound investment/decision (justification/feasibility),
2. To provide a basis for comparing projects. It involves comparing the total expected cost of each option against the total expected benefits, to see whether the benefits outweigh the costs, and by how much.

The CBA is related to, but distinct from the cost-effectiveness analysis. In a CBA, benefits and costs are expressed in monetary terms, and are adjusted for the time value of money, so that all flows of benefits and flows of project costs over time (which tend to occur at different points in time) are expressed on a common basis in terms of their „net present value“. <sup>36</sup>

As strictly financial matters are not exhaustive in describing the possible impacts (positive and negative) of a project, the CBA bases its assessment on criteria including social aspects, these latter, calculated from the financial analysis results and introducing corrections in order to derive their total costs and benefits. Consequently, the considered variables by this analysis are financial (monetary) and social (monetized).

**The question of the return-on-spend for geo-data** has been endeavoured by many publications years ago. The economic gain of a clever use of geo-data (organising them in services or smart tools solving/managing urban issues) **can range from tens to thousands of times their cost**. Additionally, even the indirect benefit is to be considered, normally difficult to associate at a monetary value, such as improving the mobility in a city, streamlining the energy consumption in buildings, keeping under control natural hazards risks and improving planning choices in making decision makers more aware about judgement parameters (A GIS provides capabilities to undertake modelling scenarios and test “*what if ?*” type queries. This is an extremely powerful tool for planners whereby different potential outcomes resulting from changes to the input parameters can be tested quickly and efficiently. The potential for better-informed decision-making is thus greatly increased).

There is no 'cookbook' for benefit-cost analyses. Each analysis is different and demands careful and innovative thought. It is helpful, however, to have a standard sequence of steps to follow. This provides consistency from one analysis to another, which is useful to both the analysts doing the study and the managers reading the report<sup>37</sup>. Benefit-cost analysis is simply rational decision-making.

## 4.2 Service Pricing

The service pricing (Deliverable D3.4 to be delivered in Month 20) is going to develop the following aspects:

- **Perceived value to the customer** – it is important to measure and evaluate the value of the offered services from the customer point of view. This is a challenging task that becomes more of an art than a science.
- **Competitors' pricing** – prices for similar services offered by competitors should be analysed.
- **Cost-plus pricing** – this standard method of pricing seeks to first determine the cost of making a service, and then add an additional amount to represent the desired profit.

The Deliverable is elaborating on the value of the plan4business services, the competitors, the costs for the plan4business services (different costs for acquiring data), and the service pricing, based on a questionnaire.

## 4.3 Costs analysis

Much organisational effort has been put into geo-data management initiatives in recent years, and information and knowledge management related technologies have been central to many of these initiatives. Less clear is the way business is generated around potential geo-data connected services. Two effects are evident:

- a) The data (geo-data) market has a **relevant critical mass** in terms of financial flows,
- b) An exact evaluation of the key advantages of the use of geo data to final users/buyers (professionals, researches SMEs, large industry...) is quite challenging and difficult to evaluate, as it is depending on use cases in many ways (place, local technical culture and territorial capabilities matter in taking advantage from information).

A potential user of the plan4business platform will have a **number of costs** to sustain in order to access the services.

Basic cost incurred by the users can be categorized (also to be further developed in the D3.4):

1. Costs for accessing data (to download them as they are);
2. Costs for accessing platform services (standard services elaborated by the plan4business platform);
3. Costs for accessing "just in time services" (tailor made following user specific query);
4. Costs for accessing plan4business network related facilities.

It is worth to remember that to pay a fee to the plan4business portal will permit the user to access high quality information (harmonized, integrated, easy comparable...) and this will permit him / her to avoid a

number of hidden / indirect costs that would occur in case of direct elaboration of the required geo-information, as for examples: Data purchase, data capture, data conversion, data re-survey and validation, evaluation, selection, acquisition and installation of specific software and so on.

In order to run the plan4business platform there are a **number of different costs** to consider, that can be categorized as follows:

- Costs for gathering data
- Costs for making data liable
- Costs for updating platform software/s and data
- Costs for platform graphical design issues
- Costs for planning and updating provided services
- Costs for advertising and promoting the platform
- Costs for servers and domains
- Costs of managing and maintaining the plan4business platform

It is to consider that some of these costs intervene on a daily basis, while others, such as costs for system updates, are cyclical ones.

Based on these considerations, we can develop a following list of **costs** of the platform:

#### 4.3.1 Recurring Costs

##### • **Server / Domain Extended Service:**

Extended Service dedicated to separate virtual server, with 1hour response time for issues during working hours, as fast as possible during non-working-hours;

Target operational time: 24/7/365. Accepted down-time for system maintenance, may 10 hours per week, 2 hours during working hours.

Accepted down-time during issues – max 8 hours (re-establish based on mirrored server)

Approximate costs: **EUR 1.000 / Month – EUR 12.000 / Year**

These costs can be extended into a Premium service, with costs of EUR 20.400 / Year

##### • **Staff Costs - Data Maintenance / Data Management:**

The staff will be responsible for the data maintenance and management of the platform, keeping the data updated and supervising the acquisition of new data. 2 persons part/time 50% are necessary for this task.

Approximate costs: **EUR 60.000 / Year**

• **Staff Costs - Data Harmonization / Data Software:**

The staff will be responsible for the data harmonization and software update of the platform, controlling the harmonization process of data acquired (HALE), and controlling the processes of integration.

1 person part/time 50% is necessary for this task.

Approximate Costs: **EUR 35.000 / Year**

• **Staff Costs - Services Development:**

The staff will be responsible for the development of existing developed services of the platform, but also develop new services based on the acquired datasets, and therefore keeping the service offer updated and attractive.

1 person part/time 50% is necessary for this task.

Approximate costs: **EUR 45.000 / Year**

• **Staff Costs - Office Management:**

The staff will be responsible for the general management of the platform, controlling the general concept of the platform, the finances, the company development, the integration of data, services and further options, by implementing and developing the business plan of the platform.

1 person part/time 25% is necessary for this task.

Approximate costs: **EUR 40.000 / Year**

• **Staff Costs – Office Overheads:**

General office overheads to be added to the staff costs, including social security, office rent and other costs.

Approximate costs: **20% of the personnel costs (approx. EUR 40.000 / Year)**

#### **4.3.2 Non-recurring Costs**

• **Data Collection:**

Regular acquisition of approximately 50 datasets of European cities/year / built infrastructure / environment / buildings / land properties / etc., together with regular update of the data (every 6 months) – average costs of EUR 10.000 / dataset

Approximate costs: **EUR 50.000 / Year by 5 datasets/year. Other datasets free of charge**

• **Data Licensing:**

Payment of data license related to the acquired datasets mentioned above – average costs of EUR 10.000 / year

Approximate costs: **EUR 10.000 / Year**

• **Platform Advertising / Management:**

Advertisement and management concept for the platform, including publishing costs, advertising in media, etc. – estimated costs of EUR 10.000 / year

Approximate costs: **EUR 10.000 / Year**

#### **4.4 Benefits analysis**

Benefits for the platform, with exclusions of evident benefit created by direct income generated through selling data and services, are to be found in networks access and relation. In order to keep the platform running, a number of data will be provided by data manager/provider networks.

**Benefits of the platform** can be listed as follows:

*Services related*

- Income generated by selling data
- Income generated by selling harmonised and integrated data
- Income generated by selling solutions for specific and frequent use cases
- Income generated by providing specific services required by platform partners

*Networking activities related*

- Capability of intercepting users interested in being partners and eventually further data providers

- Capability of integrating the plan4business business activities together with other portals working with same services (sharing market spaces)
- Capability of becoming a benchmark for territorial partners interested in working

Based on these considerations, we can develop a following list of **benefits** of the platform:

#### 4.4.1 Sale benefits

Sale of Datasets:

##### • Datasets free of charge:

Also to be mentioned as a “non-profit” service, all public available datasets such as EUROSTAT statistics, CLC Datasets, EEA Datasets, Urban Atlas Datasets, mostly European datasets, should be available free of charge and downloadable from the platform.

Approximate benefits: **EUR 0.00 / Year (free)**

##### • Datasets for sale:

Non-public available datasets (raw data) without harmonized information, which have been acquired by the platform and can be offered with authorisation of the owner (license) - Payment by dataset

It is expected to sell an amount of 5 datasets, in the first year, 8 datasets in the second year, 12 datasets in the third year, etc.

Approximate benefits: **EUR 2.500 / Dataset**

#### 4.4.2 Service benefits

##### • Harmonization Portal:

Harmonized datasets of zoning plans across EU and integrated into join dataset; several services are proposed in this category, which can be listed as follows:

- OPEN LAND USE MAP: Harmonisation Panel and voluntary data collection - cadastral data in open format CLC OSM, for Volunteers/citizens, where the Datasets can be downloaded.

- HARMONISE: Harmonisation Panel - harmonisation and publication of spatial planning data according to the INSPIRE specifications, for Public administration, companies, organisations, municipalities...- where the datasets can be downloaded.

Approximate benefits: **EUR 48.000 / Year**

Benefits related to the harmonization tool are integrated into the "Customised services provision", with the following types of services:



- Data processing and harmonisation
- Spatial monitoring and change detection
- Spatial modelling
- Sustainable spatial planning
- Integration of IT systems

**• Analytical Search Tool:**

Functionality of filtering administrative and statistical units, with different products (document PDF / Data)

Several services are proposed in this category:

- EMBED-MAP: combination of Property Search, Location Evaluator and Analytical Search - Service offered to real estate companies to embed a customised map window, for Real Estate Agencies, with Data upload, access data through system - Basic subscription
- INVESTOR-I: Property Search, Location Evaluator and Analytical Search. For investors searching for an area of potential investment; based on a set of predefined analysis available through portal, for Investors, with Data, Maps, Text – PDF
- INVESTOR-II: Property Search, Location Evaluator and Analytical Search. Extension of INVESTOR-I enabling advanced analysis and a download of selected data, for Investors, with Data, Maps, Text – PDF
- INVESTORS-III: Property Search, Location Evaluator and Analytical Search. Extension of INVESTOR-II enabling performing user defined analyses with the assistance of the plan4business experts, for Investors, with Data, Maps, Text – PDF
- TENDER SEARCH: Property Search, Location Evaluator and Analytical Search - individual in each country, or integrated in existing systems, for Investors, with Download Document - PDF or interactive document (Reference: <http://www.tender-service.co.uk/abos.htm>)

Approximate benefits: **EUR 132.000 / Year**

**• Property Search Service:**

Access to information on real estate, properties, geolocation, building, with products such as document PDF / Data.

- ADVERT: Property Search - service will enable citizens to place on the portal an ad for selling a house, a plot or other property, for Citizens, with PDF Document with Text and Graphics
- PROMOTION: Property Search - support real estate agencies in promotion of their products and properties through the plan4business platform, for Real Estate Agencies, with Data upload, access data through system
- Basic subscription (Reference: [www.sellmyproperty.org](http://www.sellmyproperty.org))
- PROMOTION: Property Search - support real estate agencies in promotion of their products and properties through the plan4business platform, for Real Estate Agencies, with Data upload, access data through system
- Premium Upgrade
- CITY-PLAN: combination of Property Search and Harmonisation Panel - offer cities to publish and advertise their zones for investments, for Municipalities, Investors, with Data upload, publishing
- BROWNFIELD: Property Search - overview of brownfields and commercial objects - related to CITY-PLAN, for Citizens, municipalities, organisations, companies, with Maps layers, Information

Approximate benefits: **EUR 97.800 / Year**

• **Location Evaluator:**

Tool with scenario locations of given location, real estate use - combined with Property search.

Services are:

- REPORT: Location evaluator - detailed information about accessibility, public transport, schools, hospitals, environment, potential hazards etc. based on the selected location, for Citizens, with PDF Document with Text and Graphics
- REPORT-MOBILE: mobile application of Location Evaluator - APP version of REPORT, for Citizens, with Download Document - PDF or interactive document

Approximate benefits: **EUR 1.200 / Year**

• **Sale on advertisement:**

Sale of advertising announcement per object / plan, offered to all stakeholders, with the possibility to advertise their products on the platform – integrated in datasets and visualisation on maps (e.g. for Cities Real-Estate, investors, etc.) – by 1 month duration (Reference: Google Places, Google AdWords, etc. with a cost-per-click (CPC) or cost-per-acquisition (CPA) system)

It is intended to have 3 products after the third year, 5 during the fourth year, etc.

Approximate benefits: **EUR 1.500 / Product**

#### 4.4.3 Consultancy Service benefits

#### • Customized Service Provision by partners and third parties

Customized Service Provision: the plan4business staff will sell their services – 720 hours per year for direct support and services. Each hour = EUR 100

Benefits of "Customised services provision" with the following types of services:

- Data processing and harmonisation
- Spatial monitoring and change detection
- Spatial modelling
- Sustainable spatial planning
- Integration of IT systems

Approximate benefits: **EUR 72.000 / Year**

#### 4.4.4 Other funding

##### • Commercial Funding:

To be considered later on, as the platform is running and commercial funding (e.g. sponsorship from interested private actors by promoting their own products) can be included in the business plan

10.000 EUR / Year are planned in the calculation from Year 2

##### • Public Funding:

To be considered eventually, by involving public authorities in the platform, interested to promote their products and maps –e.g. by promoting their activities in INSPIRE – and to be included in the business plan

##### • Donations / Crowd-funding:

To be considered, by involving foundations or other organizations, interested in the platform and the results, also by participation in the benefits

10.000 EUR /Year are planned in the calculation from Year 3

#### 4.4.5 Revenue

Revenue of the platform can be considered if the platform is cost effective, can be included in the expected benefits. As first assumption, a minimum of 6% interest on the total benefits has been calculated as a baseline.

#### 4.5 Cost Benefits Results

As already stated before, the plan4business platform can account for a **potential market of 7,74 million of users from the private sector, and a potential market value of 25.080,96 million EUR.**

Several costs and benefits of the platform have been identified, analysed and described. In the following table, the services are detailed, including the assumed benefits.

The pricing system proposed is the following:

- **Free 1** - one product is free when the customer pays for another. An example of this model is an advanced (premium) analysis and free downloads of the result.
- **Free 2** - free services are supported by ads. This model will be the most appropriate one for the pilot applications.

### D 3.3 Customer Cost/Benefit Analysis

- **Free 3** – a lot of free services are complemented by premium services, which cover the costs for the free ones. One example of this is Skype, that lets hundreds of millions of people use a free product, then to sell a few of premium products.
- **Free 4** - is where a person gives a piece of work as a gift. An example of this is the work done on Wikipedia or OpenStreetMap. This model will be used for the Open Land Use Map.

Hereafter the overview of services is shown, provided by the platform in Year 0. Figures are incremental (Fibonacci numbers) in the next table.

Plan4business Services Detail calculation in €

Service	Service	Target customers	Product	Estimated Visits/Month	Estimated Visits/Year	Estimated Data Volume	Pricing System*	Price in EUR/each	Total EUR
1	REPORT: <b>Location evaluator</b> - detailed information about accessibility, public transport, schools, hospitals, environment, potential hazards etc. based on the selected location	Citizens	PDF Document with Text and Graphics	10	120	250 KB	Free 2	5	600
2	REPORT-MOBILE: mobile application of <b>Location Evaluator</b> - APP version of REPORT	Citizens	Download Document - PDF or interactive document	10	120	250 KB	Free 2	5	600
3	ADVERT: <b>Property Search</b> - service will enable citizens to place on the portal an ad for selling a house, a plot or other property	Citizens	PDF Document with Text and Graphics	10	120	500 KB	Free 2	10	1.200
4	PROMOTION: <b>Property Search</b> - support real estate agencies in promotion of their products and properties through the plan4business platform	Real Estate Agencies	Data upload, access data through system - Basic subscription (Ref: <a href="http://www.sell-myproperty.org">www.sell-myproperty.org</a> )	5	60		Free1, Free 2	30	1.800
4	PROMOTION: <b>Property Search</b> - support real estate agencies in promotion of their products and properties through the plan4business platform	Real Estate Agencies	Data upload, access data through system - Premium Upgrade	2	24		Free1, Free 2	200	4.800
5	EMBED-MAP: combination of <b>Property Search, Location Evaluator and Analytical Search</b> - Service offered to real estate companies to embed a customised map window	Real Estate Agencies	Data upload, access data through system - Basic subscription	3	36		Free1, Free 2	250	9.000
6	CITY-PLAN: combination of <b>Property Search and Harmonisation Panel</b> - offer cities to publish and advertise their zones for investments	Municipalities, Investors	Data upload, publishing	5	60		Free1, Free 2	1.000	60.000

### D 3.3 Customer Cost/Benefit Analysis

7	BROWNFIELD: <b>Property Search</b> - overview of brown-fields and commercial objects - related to CITY-PLAN	Citizens, municipalities, organisations, companies	Maps layers, Information	5	60	1MB	Free 2	500	30.000
8	INVESTOR-I: <b>Property Search, Location Evaluator and Analytical Search</b> . For investors searching for an area of potential investment; based on a set of predefined analysis available through portal.	Investors	Data, Maps, Text - PDF	5	60	1-2MB	Free 3 (free)	500	30.000
9	INVESTOR-II: <b>Property Search, Location Evaluator and Analytical Search</b> . Extension of INVESTOR-I enabling advanced analysis and a download of selected data.	Investors	Data, Maps, Text - PDF	2	24	2-5MB	Free 3 (premium)	1.250	30.000
10	INVESTORS-III: <b>Property Search, Location Evaluator and Analytical Search</b> . Extension of INVESTOR-II enabling performing user defined analyses with the assistance of the plan4business experts	Investors	Data, Maps, Text - PDF	2	24	5-10MB	Free 3 (premium)	2.500	60.000
11	OPEN LAND USE MAP: <b>Harmonisation Panel</b> and voluntary data collection - cadastral data in open format CLC OSM	Volunteers/citizens	Download Datasets	10	120	2-10MB	Free 4	0	0
12	HARMONISE: <b>Harmonisation Panel</b> - harmonisation and publication of spatial planning data according to the INSPIRE specifications	Public administration, companies, organisations, municipalities, ...	Download Datasets	2	24	2-10MB	Free 3 (premium)	2.000	48.000
13	TENDER SEARCH: <b>Property Search, Location Evaluator and Analytical Search</b> - individual in each country, or integrated in existing systems	Investors	Download Document - PDF or interactive document (Ref: <a href="http://www.tender-service.co.uk/abos.htm">http://www.tender-service.co.uk/abos.htm</a> )	5	60	1MB	Free 1, Free 2	50	3.000
Harmonization Tool			Total/Year						48.000
Analytical Search Tool			Total/Year						132.000
Property Search Service			Total/Year						97.800
Location Evaluator			Total/Year						1.200
Services Total									279.000

Table 4: Services and products provided through plan4business

The final results of the Costs-Benefits Analysis can therefore be developed as following, including all costs occurring for the platform, combined with the estimated benefits and the revenues.

### D 3.3 Customer Cost/Benefit Analysis

Plan4business Cost Benefits Analysis in €											
Costs Description	Details	Cost Unit €	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8-12
<b>Recurring Costs</b>											
Server / Domain Extended Service	Extended Service with response time 1 hour		0	12.000	12.000	12.000	12.000	12.000	12.000	12.000	60.000
Data Maintenance / Management - Staff costs: 2 persons part/time 50%			0	60.000	61.200	62.424	63.672	64.946	66.245	67.570	337.849
Data Harmonization / Software - Staff costs: 1 person part/time 50%			0	35.000	35.700	36.414	37.142	37.885	38.643	39.416	197.078
Services Development - Staff costs: 1 person part/time 50%			0	45.000	45.900	46.818	47.754	48.709	49.684	50.677	253.387
Office Management - Staff costs: 1 person part-time 25%/time			0	40.000	40.800	41.616	42.448	43.297	44.163	45.046	225.232
Offices Overhead (20% personnel)			0	38.400	39.120	39.854	40.603	41.368	42.147	42.942	214.709
<b>Non-Recurring Costs</b>											
Data collection 5 cities/year + data maintenance: average of 10.000 €/dataset (other datasets free)		10.000	0	50.000	50.000	50.000	50.000	50.000	40.000	30.000	150.000
Data Licensing (average/year)		10.000	0	10.000	10.000	10.000	10.000	10.000	10.000	10.000	50.000
Platform Advertising / Management			0	20.000	20.400	20.808	21.224	21.649	22.082	22.523	112.616
<b>Total Costs</b>											
			0	310.400	315.120	319.934	324.845	329.854	324.963	320.174	1.600.872
Benefits	Details		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8-12
<b>Sale benefits</b>											
Datasets free of charge	Public available datasets for free, such as EURO-STAT Statistics, CORINE, EEA Data, etc.	0	0	0	0	0	0	0	0	0	0
Datasets for Sale	Non-public available datasets (raw data) without harmonized information - Payment by dataset	2.500	0	12.500	20.000	30.000	40.000	40.000	45.000	50.000	250.000
<b>Services</b>											

### D 3.3 Customer Cost/Benefit Analysis

• Harmonization Portal	Harmonized datasets of zoning plans across EU and integrated into join dataset	48.000	0	48.960	49.939	50.938	51.957	52.996	54.056	55.137	275.685
• Analytical Search Tool	Functionality of filtering administrative and statistical units (Product: document PDF / Data)	132.000	0	138.600	141.372	144.199	147.083	150.025	153.026	156.086	780.431
• Property Search service	Access to information on real estate, properties, geo-location, building (Product: document PDF / Data)	97.800	0	99.756	101.751	103.786	105.862	107.979	110.139	112.341	561.707
• Location Evaluator	Tool with scenario locations of given location, real estate use - combined with Property search	1.200	0	1.224	1.248	1.273	1.299	1.325	1.351	1.378	6.892
• Sale on advertisement	Sale of advertising announcement per object / plan - 1 month duration	1.500	0	0	4.500	7.500	10.500	15.000	18.000	22.500	112.500
Consultancy Service											
Customized service provision by partners and third parties	staff participation in project investment: 3 persons by 20hours/month each = 720 hours	100	0	72.000	73.440	74.909	76.407	77.935	79.494	81.084	405.418
Commercial Funding			0	10.000	15.000	15.000	20.000	20.000	25.000	25.000	125.000
Public Funding			0	0	0	10.000	10.000	10.000	10.000	10.000	50.000
Donations / Crowdfunding			0	0	0	0	0	0	0	0	0
Total Benefits		0	383.040	407.251	437.606	463.108	475.260	496.065	513.527	2.567.633	
Revenue	Details	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8-12	
Benefits detail	6% average	0	22.982	24.435	26.256	27.786	28.516	29.764	30.812	154.058	
Cost avoidance		0	0	0	0	0	0	0	0	0	
Other savings		0	0	0	0	0	0	0	0	0	
Balance	Details	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8-12	

Net Cash Flow	0	72.640	92.131	117.67 1	138.26 3	145.40 6	171.10 2	193.352	966.761
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Table 5: Plan4business Cost Benefits Analysis in €

#### Estimation method and references:

- **Reference for the recurring costs** of the platform are based on the Deliverable D6.3 “System operation and maintenance procedure and guidelines”, submitted in Month 18.
- **Reference for the non-recurring costs** (acquiring datasets, data license) are based on real market prices:
  - Prices of data sets of Eurogeographics ([www.eurogeographics.org](http://www.eurogeographics.org))
  - Official request done by the City of Frankfurt (Germany) for buying urban datasets,
  - Official request done by the City of Munich (Germany) for buying urban datasets,
  - Official request and discussion with Dr. Jörg Reichling, Director, and Lars Behrens, Geo-Business GIW Kommission on geo datasets  
<http://www.geobusiness.org/Geobusiness/Navigation/projekte,did=457890.html>
- **Reference for the service prices:**
- Analytical Search Tool: Prices based on services offered, e.g.
  - <http://www.tender-service.co.uk/abos.htm>
  - <http://www.properties-in-europe.com/subscribe.htm>
  - ESRI Analytics: <http://www.esri.com/software/bao-api/bao-api-pricing>
  - <http://www.esri.com/software/businessanalyst>
- Property Search service: Prices based on services offered, e.g.
  - [www.sellmyproperty.org](http://www.sellmyproperty.org)
  - <http://www.uklanddirectory.org.uk/brownfield.asp>
  - <http://www.premier-propertysearch.co.uk/feestructure.htm>
- Location Evaluator: Prices based on services offered, e.g.
  - Google Business: <https://www.google.com/services/sitemap.html>
  - <http://www.zooplapropertygroup.com/our-portfolio/>
- Sale on advertisement:
  - Google: <http://www.marketwired.com/press-release/where-does-google-make-its-money-new-research-from-wordstream-reveals-most-expensive-1539227.htm>
  - <http://www.magicbricks.com/advertise-with-us>



#### 4.5.2 Cost Benefits for the platform - Conclusion

Several costs and benefits of the platform have been identified, analysed and described. In the previous table, the services were detailed, including the assumed benefits.

As stated before, the plan4business platform is targeting a potential market of 7,74 million of users from the private sector, and a potential market value of 25.080,96 million EUR.

Further information and survey on the platform competitors in the following chapter (4.6) indicate that the potential market value is quite realistic: the small company NORDECA, addressing only northern European countries, is making a turnover of 6 million EUR with 16 employees.

The estimated results of the cash flow starts with an approximate amount of EUR 72.640 expected to grow in the following years. A positive benefit is therefore realistic in a short time period. This analysis, of course, is conservative; it is based on the assumption that the platform is functional at the end of the project in 2014 and that all parameters and services are implemented and respected.

**Different results in the balance and costs/benefits may appear if the partners are investing “in-kind” personnel costs or data. A stronger investment of the partners will definitively reduce the investment cost; the platform can therefore become efficient and rentable earlier.** Also the pricing system proposed is going to play an important role, regarding the attractiveness of the platform (Deliverable in Month 20).

#### 4.5.3 Cost Benefits for the customer

Benefits for the users can be identified as follows:

- Reduced search time for planning data
- Resolution accuracy: capability of interpreting planners' specific requests (smart to planners language)
- Geo-data service insight: accessing quick geo-data (updated and organised by specific users queries)
- Harmonised and integrated data sets provided

Their costs are of course comparable to the benefits of the platform; combined with the benefits of the users, such as reduced time for data search and acquiring, the following calculation could be developed.

Plan4business Cost Benefits Analysis for users in €										
Costs	Details	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8-12
Buy										
Datasets free of charge	Public available datasets for free, such as EURO-STAT Statistics,	0	0	0	0	0	0	0	0	0

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	CORINE, EEA Data, etc.											
<b>Datasets for Sale</b>	Non-public available datasets (raw data) without harmonized information - Payment by dataset	2.500	0	12.500	20.000	30.000	40.000	40.000	45.000	50.000	250.000	
<b>Services</b>												
• <b>Harmonization Portal</b>	Harmonized datasets of zoning plans across EU and integrated into join dataset	48.000	0	48.960	50.429	52.950	57.186	64.620	78.191	104.776	523.878	
• <b>Analytical Search Tool</b>	Functionality of filtering administrative and statistical units (Product: document PDF / Data)	132.000	0	134.640	138.679	145.613	157.262	177.706	215.025	288.133	1.440.665	
• <b>Property Search service</b>	Access to information on real estate, properties, geo-location, building (Product: document PDF / Data)	97.800	0	99.756	102.749	107.886	116.517	131.664	159.314	213.480	1.067.402	
• <b>Location Evaluator</b>	Tool with scenario locations of given location, real estate use - combined with Property search	1.200	0	1.224	1.261	1.324	1.430	1.616	1.955	2.619	13.097	
• <b>Sale on advertisement</b>	Sale of advertising announcement per object / plan - 1 month duration	1.500	0	1.530	1.576	1.655	1.787	2.019	2.443	3.274	16.371	
<b>Total Costs</b>			<b>0</b>	<b>298.610</b>	<b>314.693</b>	<b>339.428</b>	<b>374.182</b>	<b>417.626</b>	<b>501.927</b>	<b>662.283</b>	<b>3.311.413</b>	

Benefits Description	Details	Unit	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8-12
<b>Benefits</b>											
<b>Reduced search time for Location Evaluator - REPORT</b>	Time saved for data search: 3 hours per item	120	0	18.000	18.360	18.727	19.102	19.484	19.873	20.271	101.355
<b>REPORT-MOBILE: mobile application of Location Evaluator</b>	Time saved for data search: 3 hours per item	120	0	18.000	18.360	18.727	19.102	19.484	19.873	20.271	101.355
<b>ADVERT: Property Search - time saved</b>	Time saved for data search: 3 hours per item	120	0	18.000	18.360	18.727	19.102	19.484	19.873	20.271	101.355
<b>PROMOTION: Property Search - time saved</b>	Time saved for data search: 3 hours per item	60	0	9.000	9.180	9.364	9.551	9.742	9.937	10.135	50.677
<b>PROMOTION: Property Search - time saved</b>	Time saved for data search: 3 hours per item	24	0	3.600	3.672	3.745	3.820	3.897	3.975	4.054	20.271
<b>EMBED-MAP: combination of Property Search, Location Evaluator and Analytical Search - time</b>	Time saved for data search: 3 hours per item	36	0	5.400	5.508	5.618	5.731	5.845	5.962	6.081	30.406

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saved											
<b>CITY-PLAN: Property Search and Harmonisation Panel - time saved</b>	Time saved for data search: 3 hours per item	60	0	9.000	9.180	9.364	9.551	9.742	9.937	10.135	50.677
<b>BROWNFIELD: Property Search - time saved</b>	Time saved for data search: 3 hours per item	60	0	9.000	9.180	9.364	9.551	9.742	9.937	10.135	50.677
<b>INVESTOR-I: Property Search, Location Evaluator and Analytical Search. Time saved</b>	Time saved for data search: 3 hours per item	60	0	9.000	9.180	9.364	9.551	9.742	9.937	10.135	50.677
<b>INVESTOR-II: Property Search, Location Evaluator and Analytical Search. Time saved</b>	Time saved for data search: 3 hours per item	24	0	3.600	3.672	3.745	3.820	3.897	3.975	4.054	20.271
<b>INVESTORS-III: Property Search, Location Evaluator and Analytical Search. Time saved</b>	Time saved for data search: 3 hours per item	24	0	3.600	3.672	3.745	3.820	3.897	3.975	4.054	20.271
<b>OPEN LAND USE MAP: Harmonisation Panel and voluntary data collection - time saved</b>	Time saved for data search: 3 hours per item	120	0	18.000	18.360	18.727	19.102	19.484	19.873	20.271	101.355
<b>HARMONISE: Harmonisation Panel - time saved</b>	Time saved for data search: 3 hours per item	60	0	9.000	9.180	9.364	9.551	9.742	9.937	10.135	50.677
<b>TENDER SEARCH: Property Search, Location Evaluator and Analytical Search - time saved</b>	Time saved for data search: 3 hours per item	60	0	9.000	9.180	9.364	9.551	9.742	9.937	10.135	50.677
<b>Total Benefits</b>			<b>0</b>	<b>142.200</b>	<b>145.044</b>	<b>147.945</b>	<b>150.904</b>	<b>153.922</b>	<b>157.000</b>	<b>160.140</b>	<b>800.701</b>
Balance	Details		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8-12
Benefits			0	156.410	169.649	191.483	223.278	263.704	344.927	502.142	2.510.712

Table 6: Plan4business Customer Cost Benefits Analysis in €

As a conclusion: the benefits of the customer by using the platform are mainly in the working time saved by searching and harmonizing the datasets. This improvement of the workflow leads to a positive balance of costs saved of estimated around EUR 140.000 / Year.

## 4.6 Platform Competitors

Plan4business is providing an added value of services and not just providing data: in order to be competitive on the business market, plan4business will offer the data itself in integrated, harmonised and thus ready-to-use form, but it will also have to offer rich analysis and visualisation services via an adapted Application

Programming Interface (API) and an interactive web frontend. There are many initiatives offering data but not providing solutions and or services tailor-made on reliable and real professional life use cases.

The present analysis of competitors is based on the survey of active key players in the fields of Geographic Information and Business Intelligence.

Geographic Information is a well-known field for the consortium, but the plan4business platform is also touching the field of Business Intelligence. In this context, Business Intelligence is a set of theories, methodologies, processes, architectures, and technologies that transform raw data into meaningful and useful information for business purposes. Business Intelligence can handle large amounts of information to help identify and develop new opportunities, which can, together with effective strategies, provide competitive market advantage and long-term stability. The technologies, or tools (Business Intelligence Tools), are technologies such as reporting, online analytical processing, analytics, data mining, process mining, complex event processing, business performance management, benchmarking, text mining, predictive analytics and prescriptive analytics – by using spread sheets, reporting and querying software, etc.

#### 4.6.1 Kind of competitors and competition

Related to the plan4business platform and the list of Key Players, a distinction has to be made between Data Provider and Service Provider. According to the plan4business Business approach, Data Providers can be considered as plan4business partners, and Service Providers as competitors.

In the present analysis, we identify out of the survey of key players the competitors of the plan4business platform, therefore the actors offering superior customer value in the plan4business market – which is directly related to the Unique Selling Point concept compared to the plan4business services. They may compete on the following criteria (competition fields): **Background** (online presences, organizational structure), **Financials** (profitability, profit growth profile), **Products** (product line, product portfolio balance, new products developed and success rate, branding), **Marketing** (market shares, customer base, growth rate, customer loyalty, online promotional strategy, geographical coverage, etc.), and **staff** (employees, strength of management).

Competitors of the plan4business platform can therefore be public or private companies, active in all or selected fields of geographic information and / or business activities.

#### 4.6.2 List of Key Players

The survey of Key Players in the fields of Geographic Information and Business Intelligence is based on the results of the GINIE – Geographical Information Network in Europe<sup>38</sup> –, which was elaborated in 2003: the purpose of the GINIE report was to gather the information on the key GI players in Europe in order to gain an improved understanding of the GI capacity within each country.

The plan4business consortium completed the information inside the survey; several new players and identified competitors were added – regarding the partner countries, the survey is now up-to-date. The completed survey is covering 30 Member States of the European Union, as well as the EU level and the worldwide level. The total list can be found in the Annex 1 of this report. The survey collected information on the name of the Company or Institution, the type (public / private, ministry, etc.), the sectors, the product type (raster product, vector product, services), the turnover and the staff. If available, information was also collected on product prices, availability (download, subscription) and license.

The sectors identified were:

Sectors			
CG	Central Government	Ret	Retail and commercial
LG	Local/municipality Government	Fin	Financial
Uti	Utilities	Def	Defence and Military
Tel	Telecoms	Hea	Health
Tra	Transport	Env	Environment
Ems	Emergency services	Cri	Crime
Edu	Education/Research	Prop	Property/Construction
Con	Consumer	Oth	Other
LBS	Location Based Services		

In total, more than 500 players could be identified throughout the 30 EU Member States – although more players are active in the field: a lot of players are SME's, with a small turnover and employees, dominated by European key players, such as the European Community (E.g. European Environment Agency EEA), some of the pan-European bodies such as EuroGeographics, EUROGI and private sector players such as Tele Atlas and NavTeQ. Tele Atlas (US/NL) has been integrated 2008 in TomTom, The Netherlands. Global players are also ESRI (US/EU), Dell (US), HP (US), IBM (US), Intergraph (US), Microsoft (US/EU), OGC (EU), Apple Maps/TomTom (US/NL) and Oracle (US).

At the national level, the players are always including the National GI Associations, the National Mapping Organisations, the Cadastre Agencies, and possibly the land registration offices. They may include government departments, such as statistical offices. There is clearly a trend across Europe for the development of “e-public services” and the growth of such services may have a large impact on the GI sector, if the significance of geography in these services is recognised during their implementation. The EC's

IDA Programme is set to become the IDAabc (Interoperable Delivery of pan-European eGovernment Services to Public Administrations, Businesses and Citizens) Programme, following a proposal adopted by the European Commission. The list should perhaps include national GI policy defining and co-ordinating bodies, but these do not appear to be widespread. In many countries there are very strong regional or municipality influences and while the plethora of SMEs might not have a great impact individually, their collective contribution is significant.

Regarding the identification of the competitors, URL and short description were added, as well as a short description of the products was collected.

#### 4.6.3 Selected Competitors

The competitors of the plan4business platform were selected out of the key players survey and completed with international (mostly US) companies and organizations, which are active globally.

We identified 12 main global / worldwide competitors and 19 European / national competitors. Most of the competitors are private companies, working in the sectors of Location Based Services (LBS), Transport (TRA), Utilities (UTI), Education/Research (EDU) and Business Intelligence (BI). Their turnover varies between 850 MIL US Dollars (NAVTEQ) and 4 MIL EUR (AND Consulting Services). Also their number of staff varies between 7.000 (Google Maps) or 5.500 (NAVTEQ) and 16 (NORDECA, Norway). Small enterprises with around 15 employees can achieve a turnover of yearly 5 – 6 Million EUR, which is a good reference for the plan4business dimension and an interesting target for the platform.

The selection criteria were the services categories (see Overview of Services Chapter 4.5.1) identified for the plan4business platform, and not the data providers, as they can be plan4business partners.

Finally, the competitors are offering several product types: vector based products, raster based products, services based on mapping queries, automotive solutions, 3D services, business intelligence tools, map intelligence, statistical analysis methods, econometric modelling.

plan4business: Competitors and Products Survey

Country	URL	short description	Name Company / Institution	Type (public / private, ministry, etc)	Sectors	Product Type (raster product, vector product, services)	Turnover	Staff
USA	<a href="https://maps.google.com">https://maps.google.com</a>	Google Maps Engine Lite lets you quickly and easily make custom maps and share them.	GOOGLE - MAPS	PRIVATE	LBS	VECTOR, RASTER, SERVICES BASED ON MAPPING QUERIES	50,18 BLN. US DOLLARS	7.000
USA	<a href="http://www.esri.com">www.esri.com</a>	Esri (/ 'esri:/) is a software development and services company providing Geographic Information System (GIS) software and geodatabase management applications	ESRI	PRIVATE	LBS	VECTOR, RASTER, SERVICES BASED ON MAPPING QUERIES <a href="http://www.urbanobservatory.org/">http://www.urbanobservatory.org/</a>	660 MIL. US DOLLARS	3.000

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USA	<a href="http://www.geodecisions.com">www.geodecisions.com</a>	GEODECISIONS deliver strategic geographic information systems (GIS), information technology (IT), and intelligent transportation system (ITS) solutions and applications to empower defense, homeland security, transportation, state, county, municipal, and commercial clients to make smarter, more-informed decisions.	GEO-DECISIONS	PRIVATE	LBS, TRA	VECTOR, RASTER, SERVICES BASED ON MAPPING QUERIES	?	300 (100-500)
USA	<a href="http://www.mapinfo.com">www.mapinfo.com</a>	products included a desktop mapping application, various map and demographic data products, and some web-based applications.	MAPINFO	PRIVATE	LBS	VECTOR, RASTER, SERVICES BASED ON MAPPING QUERIES	100 MIL. US DOLLARS	750 (500-1000)
USA	<a href="http://www.navteq.com">www.navteq.com</a>	NAVTEQ is a Chicago-based provider of Geographic Information Systems (GIS) data and is a major provider of base electronic navigable maps. The company is a wholly owned subsidiary of Nokia but operates independently.	NAVTEQ / NOKIA	PRIVATE	LBS	VECTOR, RASTER, SERVICES BASED ON MAPPING QUERIES	853 MIL US DOLLARS (2007)	5.500 (2007)
GLOBAL	<a href="http://datamarket.com/">http://datamarket.com/</a>	The open portal to thousands of datasets from leading global providers.	DataMarket	PRIVATE		Open Data Portal, Data provision, Data sharing hub, data visualisations-country reports, e.g. <a href="https://datamarket.com/topic/71/czech-republic">https://datamarket.com/topic/71/czech-republic</a>		
USA	<a href="http://www.ecrion.com/aboutus/aboutus.aspx">http://www.ecrion.com/aboutus/aboutus.aspx</a>	Ecrion is a leading provider of innovative data integration, document production, and business intelligence technologies. This company works with local and multinational organizations across industries and revenue bands to implement comprehensive solutions to mission critical business challenges. Their results-oriented approach combines Ecrion's technology and expert knowledge to deliver highly accessible end-to-end solutions.	ECRION SOFTWARE INC	PRIVATE	BI, LBS	BUSINESS INTELLIGENCE SOFTWARE	?	?
AUS-TRALIA	<a href="http://www.integeogeo.com">http://www.integeogeo.com</a>	Integeogeo was founded in 2004 to develop and commercialize Map Intelligence. The company is a global leader in the converging fields of Business and Location Intelligence with its Map Intelligence 'spatial hub' bringing mapping visualizations and analytical capabilities to a diverse range of customers covering all levels of government (Federal, State and local) and across many industry sectors such as banking and insurance, retail, transport and telecommunications. Their corporate goal is to significantly improve the outcomes of your decision making processes.	INTEGEO	PRIVATE	MAP INTELLIGENCE	MAP SOFTWARE AND BUSINESS INTELLIGENCE, DATA VISUALIZATION	?	?

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<b>RUS-SIA</b>	<a href="http://www.prognoz.com">www.prognoz.com</a>	world-class Business Intelligence (BI) applications provider. Fields of their activities are leading-edge analytics, multi-dimensional data cubes and robust econometric forecasting tools. In the clipped pace of the Information Age, our tools help users distill raw data quickly and accurately from a multitude of sources, resulting in sound decisions and money saved. Prognoz solutions stand at the frontier of innovation	<b>PROGNOZ</b>	PRIVATE	BUSINESS INTELLIGENCE, ANALYTICS, FORECASTING TOOLS	Analytics platform, easy-to-use tools for business applications	?	1.500
<b>EUROPE (THE NETHERLANDS-ROTTERDAM)</b>	<a href="http://www.and.com/">http://www.and.com/</a>	Provider of location, routing, mapping and address management technologies and intelligence which power enterprise applications worldwide.	<b>AND CONSULTING SERVICES</b>	PRIVATE	LBS, TRA, UTI	VECTOR, RASTER, INTERNET MAPPING, AUTOMOTIVE AND FLEET MANAGEMENT	4 MIL EUR	80
<b>EUROPE (UK)</b>	<a href="http://www.activeinformatics.com/contact-active">http://www.activeinformatics.com/contact-active</a>	Active Informatics provides powerful but easy to use software applications for education, emergency services and health organisations to make informed strategic and operational decisions based on evidential and real-time data	<b>ACTIVE</b>	PRIVATE	LBS, EDU, UTI	VECTOR, RASTER, SERVICES BASED ON MAPPING QUERIES		
<b>EUROPE (UK)</b>	<a href="http://www.emapsite.com/mapshop/">http://www.emapsite.com/mapshop/</a>	emapsite is a leading exponent of online geographic data solutions providing services and solutions enhancing decision support through location data provisioning.	<b>EMAPSITE</b>	PRIVATE	LBS, UTI,	VECTOR, RASTER, SERVICES BASED ON MAPPING QUERIES	?	?
<b>EUROPE (NORWAY)</b>	<a href="http://www.blomasa.com/">http://www.blomasa.com/</a>	is a Norwegian geographical information and off-shore technology company. The company has offices in ten countries in Europe and offers a wide selection of geographical services, including maintaining a database. The company has its headquarters in Oslo, Norway and is listed on Oslo Stock Exchange. Blom has subsidiaries in Norway, Sweden, Finland, Germany, United Kingdom, Italy, Spain, Portugal, Romania, Czech Republic, Bulgaria and Moldova.	<b>BLOM</b>	PRIVATE	LBS	VECTOR, RASTER, SERVICES BASED ON MAPPING QUERIES, 3D CITY MODELS, GROUND SURVEY	737 MIL. NOK	700
<b>EUROPE (FRANCE)</b>	<a href="http://www.astrium-geo.com/">http://www.astrium-geo.com/</a>	Astrium Services develops an extensive portfolio of products and services spanning the entire geo-information value chain from data acquisition and processing to data management and hosting, sophisticated geo-information services and turnkey integrated solutions, bringing you exactly what you need, when and where you need it.	<b>ASTRIUM</b>	PRIVATE	LBS, EDU, UTI	VECTOR, RASTER, SATELLITE IMAGES, MAPPING SOLUTIONS,	5.8 BIL. EUR	18



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<b>EUROPE (IRELAND)</b>	<a href="http://www.myplan.ie">http://www.myplan.ie</a>	The aim of Myplan.ie is to create a one stop shop for information about plans and also to provide other information which is relevant to planning decision-making (census, heritage sites, patterns of housing development etc).	<b>Department of Environment, Community and Local Government</b>	PUBLIC	LBS	<b>MyPlan.ie</b> Interactive map viewer Integrates datasets from various resources Analysis of data	
<b>EUROPE (UK)</b>	<a href="http://www.findmaps.co.uk/">http://www.findmaps.co.uk/</a>	FIND is the UK's most advanced online mapping tool for businesses; the largest instantly accessible map and data library available. User can view, print and annotate Ordnance Survey maps, aerial photography as well as be able to export data to GIS or CAD formats for technical uses.	<b>FIND</b>	PRIVATE		200 different datasets and reports Software (web based) solutions for data analysis <a href="http://sketchmap.co.uk">sketchmap.co.uk</a>	
<b>EUROPE (UK)</b>	<a href="http://www.landmark.co.uk/">http://www.landmark.co.uk/</a>	Landmark Information Group is a market leader in the field of property related environmental risk information and digital mapping.	<b>Landmark Information Group</b>	PRIVATE		From data provision to customised applications for data analysis, reports, ...	?
<b>EUROPE (UK)</b>	<a href="http://www.planningportal.gov.uk">http://www.planningportal.gov.uk</a>	Our aim is to provide a one-stop-shop supplying answers, services and information to anyone involved in the planning process - from home owners and businesses to planning professionals and Government officials.	<b>Department of Communities and Local Government</b>	PUBLIC		Find Local Plans - search engine for planning documents in the UK Building regulations	
<b>EUROPE</b>	<a href="http://datanavigator.espon.eu/">http://datanavigator.espon.eu/</a> <a href="http://mapfinder.espon.eu/">http://mapfinder.espon.eu/</a>	The ESPON Data Navigator offers access to territorially relevant data sources on different regional levels, main national statistical series, databases from National Statistical Offices and geographic datasets.	<b>ESPON</b>	PUBLIC		Information on the data sources covers among others contact details and access conditions. The ESPON Data Navigator is focused on national structures at NUTS 2 and NUTS 3 territorial scale, according to the classification of Eurostat. In particular cases, data related to other territorial scales have been incorporated as well (NUTS 0, NUTS 1, LAU 1 or LAU 2).	
<b>GLOBAL</b>	<a href="http://datamarket.com/">http://datamarket.com/</a>	The open portal to thousands of datasets from leading global providers.	<b>DataMarket</b>	PRIVATE		Open Data Portal Data provision Data sharing hub data visualisations-country reports, e.g. <a href="https://datamarket.com/topic/71/czech-republic">https://datamarket.com/topic/71/czech-republic</a>	

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<b>EUROPE (NORWAY)</b>	<a href="http://www.infoland.no">http://www.infoland.no</a>	Distributor of property data and spatial data from Norwegian mapping authority and municipalities. Owned by Ministry of Finance, Norway. Provides base map data, planning data, utility data, etc. Has packages prepared for property developers, banks, property brokers, etc. Only Norwegian data.	<b>INFOLAND (NORSK EIENDOM-SINFORMASJON)</b>	PRIVATE (PUBLIC OWNERSHIP)		VECTOR, RASTER, SATELLITE IMAGES, MAPPING SOLUTIONS,	37 MIL EUR	68
<b>EUROPE (NORWAY)</b>	<a href="http://www.nordeca.com/">http://www.nordeca.com/</a>	Provider of spatial services, web- and mobile based mapping solutions, spatial data, consultancy services and app-development.	<b>NORDECA</b>	PRIVATE (PUBLIC OWNERSHIP)		VECTOR, RASTER, SATELLITE IMAGES, MAPPING SOLUTIONS, SERVICES	6 MILL EUR	16
<b>EUROPE (AUSTRIA)</b>	<a href="http://www.bev.gv.at">http://www.bev.gv.at</a>	The Bundesamt für Eich- und Vermessungswesen or BEV (German for Federal Office of Metrology and Surveying) is the body responsible for official surveying, geo-information and weights and measures (metrology) in Austria. It belongs to the Bundesministerium für Wirtschaft, Familie und Jugend (Federal Ministry of the Economy, Family and Youth). Its headquarters is in Vienna and it has 67 branches spread across all the Austrian federal states.[1]	<b>Bundesamt für Eich und Vermessungswesen (BEV) Federal Office of Metrology and Surveying</b>	Govt Dept	Def, CG, LG, Tra, Uti, Tel, Con, Env	Austrian Map, on-line Real Estate - (cadastre) and others	€66 Mill	1.350
<b>EUROPE (BELGIUM)</b>	<a href="http://www.star-apic.com">http://www.star-apic.com</a>	STAR-APIC is the leading European provider of software and solutions in the field of geographic information systems (GIS) dedicated to land and infrastructures management. STAR-APIC have particular expertise in the following areas: Land management (local authorities, police, forestry, agriculture, port authorities,...), Network management (water, sewerage, electricity, gas, heating, cooling, telecom, pipelines), Building and infrastructure management, telecoms and datacenters.	<b>Star Informatic</b>	PUBLIC (SA)	LG, CG, Uti, Tel, Tra	STAR Line, APIC Line, Mercator	€4.8 Mill (2002)	53 (2003)
<b>EUROPE (CZECH REPUBLIC)</b>	<a href="http://www.gepro.cz">http://www.gepro.cz</a>	GIS Company with Geoportal, Proland software, Geplan Software	<b>GEPRO, s.r.o.</b>	PUBLIC	CG, LG, Ems, Tra, Uti, Fin, Envi, Prop,	MISYS, Kokes, LUPUS, MAPA3, KOMUNIKACE, ATLAS - DTM, PROLAND	€ 1 Mill	30
<b>EUROPE (CZECH REPUBLIC)</b>	<a href="http://www.arcddata.cz/ompage/">http://www.arcddata.cz/ompage/</a>	ARCDATA PRAHA, s.r.o. was founded in 1990 as a company fully oriented to geographic information systems. ARCDATA PRAHA aims at providing the best available GIS technology and services to customers and users in the Czech Republic. ARCDATA PRAHA team consists of professionals in GIS, geography, databases, remote sensing, computer systems and programming.	<b>ARCDATA PRAHA, s.r.o.</b>	PUBLIC	CG, LG, Env, Ems, Def, Edu,	ESRI and RDAS products; satellite images, Satellite Map of the CR, ArcCR 500, ArcCR City	?	?

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<b>GLOBAL</b>	<a href="http://www.intergraph.com">www.intergraph.com</a>	Intergraph® is a leading global provider of engineering and geospatial software that enables customers to visualize complex data. Businesses and governments in more than 60 countries rely on Intergraph's industry-specific software to organize vast amounts of data and infuse the world with intelligence to make processes and infrastructures better, safer, and smarter. The company's software and services empower customers to build and operate more efficient plants and ships, create intelligent maps, and protect critical infrastructure and millions of people around the world.	<b>Intergraph CR, spol. s r.o. (HQ in USA)</b>	PUBLIC	CG, LG, For, Agr, Uti, Tra, Ret,	Intergraph products	770 MIL USD	3600
<b>EUROPE (CZECH REPUBLIC)</b>	<a href="http://www.czecin-vest.org/en">http://www.czecin-vest.org/en</a>	Established in 1992 by the Ministry of Industry and Trade, CzechInvest is the investment and business development agency of the Czech Republic whose services and development programmes contribute to attracting foreign investment and to developing Czech companies. Our mission is to support investment activities to the highest level of competence not only through our information service and consultancy but also by linkage with structural funds of the EU.	<b>Czech Invest (Investment and Business Development Agency)</b>	PRIVATE	Real Estate, business properties, brown-fields, industrial zones, financial support	<a href="http://www.brownfieldy.cz/">http://www.brownfieldy.cz/</a>	?	?
<b>EUROPE (DANMARK)</b>	<a href="http://www.cowi.com/menu/home/Pages/cowigroup.aspx">http://www.cowi.com/menu/home/Pages/cowigroup.aspx</a>	Based on our world-class competencies within engineering, economics and environmental science, we tackle challenges from many vantage points to create coherent solutions for our customer. With offices all over the world, we combine global presence with local knowledge to take on projects anywhere in the world - no matter how large or small. At any given moment, we are involved in more than 17,000 projects.	<b>COWI</b>	PRIVATE	ECONOMICS, MANAGEMENT AND PLANNING WATER AND ENVIRONMENT GEOGRAPHICAL INFORMATION AND IT RAILWAYS, etc	GEOGRAPHICAL INFORMATION AND IT GIS and IT 3D visualisation and modelling Maps and geodata products Mapping and data capture Surveying Property rights and land administration	5.110 MIL DKK (685 MIL EUR)	6.200

### D 3.3 Customer Cost/Benefit Analysis

<b>EUROPE (FRANCE)</b>	<a href="http://fr.geoconcept.com">http://fr.geoconcept.com</a>	GEOCONCEPT helps people solve their geographic problems. We provide outstanding cartographic and optimization solutions in areas as diverse as field operation scheduling, geomarketing, and emergency interventions. Building on 22 years of experience, GEOCONCEPT has brought GIS to the realm of day-to-day business applications. With 10,000 clients in more than 30 countries, GEOCONCEPT is today a world leader in cartographic display and optimization.	<b>GEOCONCEPT</b>	PRIVATE	GEO-MARKETING ANALYSIS, SCHEDULING OPTIMIZATION, TERRITORY MANAGEMENT, EMERGENCY AND SAFETY	Geographical Information System Address Geocoding Online cartographic display Creating and integrating geographical web applications Using 3D data Route calculation engine Display optimized for texts and symbols Creating geographical objects Customized map rendering Mobile solutions Geographical reporting Integration components Cartographic data	12 MIL EUR	120
<b>EUROPE (GERMANY)</b>	<a href="http://www.geocontent.de">www.geocontent.de</a>	GeoContent is one of the leading providers of aerial photography and precise geospatial information for Germany. Founded in 2001 and with over 30 highly specialised experts in various fields, GeoContent ensures the delivery of up-to-date digital orthophotos, enriched with additional content, and the continual development of new products and techniques	<b>GEOCONTENT</b>	PRIVATE	Data refinement/Product derivation Geocoding Hosting Photogrammetry	Real Estate Internet portal Cartography/GIS Community/Public administration Location-Based Services, Navigation / Telematics Rescue / Defence/Catastrophe prevention Tourism / Leisure Environment / Agriculture Insurance industry Supply and waste management	?	30
<b>EUROPE (GERMANY)</b>	<a href="http://www.geoxtend.com/">http://www.geoxtend.com/</a>	geoXtend – Ihr Partner für räumliche Planung und Analyse	<b>GEOXTEND</b>	PRIVATE	Location Intelligence - Versicherungen Banken Telekommunikation Öffentlicher Sektor Handel Transport Logistik Energieversorger	Map Intelligence (software), Geodaten und Markdaten	€2 Mil EUR	n.V.

<b>EUROPE (NETHERLANDS)</b>	<a href="http://www.wageningen-ur.nl/en/Expertise-Services/Research-Institutes/alterra.htm">http://www.wageningen-ur.nl/en/Expertise-Services/Research-Institutes/alterra.htm</a>	Wageningen UR is a collaboration between Wageningen University and the DLO foundation.	<b>WAGENINGENUR / ALTERRA</b>	PUBLIC / PRIVATE	Food and food production Living environment Health, lifestyle and livelihood	Biobased economy Coasts and Oceans Food and Health Food production Markets and Chains Nature and Landscape Water and Climate	€5 MIL EUR	6.500
<b>EUROPE</b>	<a href="http://www.eurosense.-com">http://www.eurosense.-com</a>	EUROSENSE is your partner in all services related to geographical information. From data collection, treatment and provision to value-added applications, EUROSENSE offers a broad variety of geographical information made according to your specific requirements and needs. Our company is known to provide high-quality end products created on the latest technologies on the market.	<b>EURO-SENSEs.r.o. / EUROSENSE HQ Belgium</b>	PUBLIC	Def, CG, LG, Ret, Uti, Env, Tel	Central, Georeferencing Database Land Id, Orthophotomaps Orthocoverage for IACS LPIS DTM/DSM country coverage flood simulations	€1.2 MIL EUR	200

Table 7: competitors and products survey (Source: survey plan4business, 2013)

#### 4.6.4 Conclusion

This survey on GI (Geographic Information) and BI (Business Intelligence) has collected an overview of global, European, national and local players and products. This gives an overview of the geographic information business market and the solutions already developed for the customers.

SME's can be successful on the market, by having a good solution combining software, data and services: their Unique Selling Point is convincing – they attract therefore companies and are important for the economy. As an example, NORDECA, a provider of spatial services, web- and mobile based mapping solutions, spatial data, consultancy services and app-development, has similar products to the plan4business platform, and is realizing with 16 employees a turnover of 6 MIL EUR. As NORDECA is targeting on the north-European market (mainly Norway/Sweden), it is easy to argue that an integrated platform like plan4business, combining easy-to-use interface, up-to-date data and good services, may target a similar economic dimension.

## 5 Cost Benefits and challenges - conclusions

The concept of content management has evolved dramatically over the past decade. Organizations are beginning to see widespread adoption of content management technologies and platforms / smart toolkits within their enterprise and across multiple sets of activities to managing their unstructured content or to look for additional information enhancing their grade of competitiveness.

In an imperfect market where access to data can be free or very expensive, but where benefits are connected to prices, a working strategy depends on the capability of smart platforms to build added value around available information. Furthermore, this is a market where data quality is not direct proportional to data costs (open data can often have excellent properties), introduces other elements of complexity in the “data game”. As mentioned before (chapter 1.1), the plan4business platform is under construction, and planned platform services are not yet operational, hence the proposed results are based on expectations and assumptions linked to broadly acknowledged estimations done on geo-data services market value (chapter 4, specifically 4.2 and 4.4): here are limits and prospective of the proposed analysis.

Benefits, in our hypothesis, increase with the capability of the platform to contain more data: **data critical mass increases – services have more coverage – quality is constantly updated – services are liable and requested.**

Despite all the difficulties in quantifying major benefits connected to use of geo-data and related systems, there are some aspects to be considered. As reported by Korte (1996) and still valid today, in a well-known report on GIS studies (The Joint Nordic KVANTIF project Report) - presenting information on costs, benefits, and applications of 16 well-established GIS projects in North America and two in Italy – some basic aspects have to be taken into consideration:

1. If a system is used only for computer-aided mapping and updating, it gives a full return on investment (**B/C 1:1**).
2. If the system also is used for planning and engineering purposes, the investment will be doubled (**B/C 2:1**). The ratio would rise to **4:1** where all commonly used data sets have been automated.
3. Research reports publish in Norway and Sweden show that the B/C ratio for automating conventional maps is greater than **3:1**.
4. If a common system is created in which information can be shared among different relevant organizations, the investment will come back four times (**B/C 4:1**)

This report has more than one decade, and as mentioned, in this range of time many new ideas have been introduced in the mainstream of content management services and goods, but the above listed points still are valid. They are effective, especially in explaining a possible future in the market for the plan4business platform, as they clearly state that benefits increase their value in the moment that “sharing” and “planning and engineering purposes” are considered.

Moreover, we can presume that all the operations of “data harmonisation and integration” operated by the plan4business platform will further increase the value of benefits. Finally, the idea of plan4business is that of providing “tailor made services” prepared on use cases based on real practices, this approach can extra extend the already robust “benefits chain” supporting the platform.

All these considerations are in favour of the cost benefit model and business plan promoted for the plan4business platform. Although the above listed considerations were formulated more than ten years ago, they still clearly address potentialities of geo-data applications. Additionally to that, it is to consider the role of services economy in Europe, especially in those economies based on knowledge, hence information (data) elaboration. Plan4business is a platform situated in a market that is not a niche, but as demonstrated in previous chapters (esp. 2.2 and 4.5), it can intercept both a relevant number of users (impressive just by considering the potential users linked to territorial planning professions) and a rich set of users (GI infrastructure users) in different productive domains. Considered users, moreover, have been assessed both in public and private realms: perspectives are good, and when services will be set up, it will be possible to further refine the analysis hereby provided.

This first cost benefits analysis of the platform demonstrates that a first period of investment and working time will be necessary to make the platform beneficial. Benefits for the platform will grow after this 5-years period.

On the contrary, the customers are benefiting from the platform from the beginning, by saving working time related to the different services offered by the platform.

## ANNEX 1

### plan4business: Key Players / Competitors and Products Survey

Name Company / Institution	Type (public / private, ministry, etc)	Sectors	Product Type (raster product, vector product, services)	Turnover	Staff
<b>Austria</b>					
Bundesamt für Eich und Vermessungswesen (BEV) Federal Office of Metrology and Surveying	Govt Dept	Def, CG, LG, Tra, Uti, Tel, Con, Env	<a href="#">Austrian Map on-line</a> Real Estate (cadastre) and others	€66 Mill	1350
Umweltbundesamt GmbH	Private company owned by Federal Environment Agency	CG, LG, Env	<a href="#">Österreichische Umweltkarten im Internet</a>		280
Synergis	PLC	CG, LG, Tra, Uti, Tel, Def, Prop, Env	ESRI Leica ERDAS		
GISquadrat	PLC	Env, CG, LG, Tra, Uti, Tel	Geoprovider ResPublica		
Axmann Geoinformation	PLC	Con, CG, LG, Tra, Uti, Tel	<a href="#">Safe FME</a>		
WIGeoGIS	PLC	CG, LG, Tra, Uti, Tel, Def, Con, Env	<a href="#">WIGeoMao</a> <a href="#">WIGeoStreet</a> <a href="#">NextDoorXML</a>		
GEOSPACE Beckel	PLC	CG, LG, Tra,	<a href="#">Raw satellite</a>		
Satellitenbilddaten GmbH		Uti, Tel, Def	<a href="#">imaae data</a> from SPOT, LANDSAT, IRS, ERS-1/ERS-2,		



## D 3.3 Customer Cost/Benefit Analysis

			Radarsat, NOAA, Meteosat		
PROGIS	PLC	CG, LG, Tra, Uti, Tel, Def	WinGIS		
<b>Belgium</b>					
Institut Geographique National -Belgique (IGN-B)	NMO, public service under the Ministry of Defence	LG, CG, Uti.Tel, Tra, Prop, Def, Env, Edu	Top10v-GIS Top50v-GIS. Top250v-GIS CORINE DTED, Admin-v, Aerial photos and digital orthophotos cConvert. P7. Libaeo	€13.5 Mill (2002)	269 (2002)
Administration du cadastre, de l'enregistrement et des domaines	Gov Dept	CG, LG, Prop	Cadastral maps: Cad-net  On-line access for notaries to Parcels/owners data base Boundary line		4,800 (2001)
Centre d'informatique pour la Region Bruxelloise (CIRB)	Public Agency	Con, LG, CG, Uti.Tel, Tra, Edu	Brussels UrbIS		
Ministere Wallon De L'Equipement et Des Transports (MET)	Regional Gov Dept	LG, CG, Uti.Tel, Tra, Prop	BRIGIT  WALCORS  PICC		
Vlaamse Landmaatschappij (VLM)	Regional Gov Dept	CG, LG, Uti.Tel, Tra, Con	GIS-Vlaanderen		
Star Informatic	PLC (SA)	LG, CG, Uti.Tel, Tra	STAR Line  APIC Line  Mercator	€4.8 Mill (2002)	53 -2003
<b>Bulgaria</b>					
Ministry of regional development and public works	Gov Ministry	CG, LG, Env, Uti, Edu, Def			

## D 3.3 Customer Cost/Benefit Analysis

Geodesy and Cartography Directorate	Gov Dept	CG, LG, Env, Con, Edu, Def			280
Cadastre agency	Executive Agency under Minister for Regional Development and Public Works	CG, Lg, Env, Uti, Edu, Def	Cadastre		
Military Topographic Survey	Gov Dept	Def, CG, LG			
Ministry of Environment and Water	Gov Dept	Env, Tra, Uti, CG,	Hydrology		
Ministry of Agriculture and Forestry	Gov Dept	Env, Agr, CG, Uti,			
ESRI Bulgaria Ltd	PLC	CG, LG, Env, Tra, Uti,	ESRI		
Datecs Ltd GIS Centre	PLC	CG, LG, Env, Tra, Uti,	MapInfo		
Datamap-Europe Ltd.	PLC	CG, LG, Env, Tra, Uti,	Intergraph		
Geomatics	PLC	CG, LG, Env, Tra, Uti,	ESRI Military Mapping		
Technical University of Sofia	University				
<b>Czech Republik</b>					
GEPRO, s.r.o.	PLC	CG, LG, Ems, Tra, Uti, Fin, Envi, Prop,	MISYS, Kokes, LUPUS, MAPA3, KOMUNIKACE, ATLAS - DTM, PROLAND	€ 1 Mill	30
ARCDATA PRAHA, s.r.o.	PLC	CG, LG, Env,	ESRI and RDAS		

## D 3.3 Customer Cost/Benefit Analysis

		Ems, Def, Edu,	products; satellite images, Satellite Map of the CR, ArcCR 500, ArcCR City		
Intergraph CR, spol. s r.o. (HQ in USA)	PLC	CG, LG, For,	Intergraph products		
		Agr, Uti, Tra, Ret,			
Czech Association for Geoinformation	association			€ 60,00	4 (2002)
Nemoforum	association			hosted by COSMC	2 (17 collective members)
Czech Invest (Investment and Business Development Agency <a href="http://www.czechinvest.org/en">http://www.czechinvest.org/en</a> )	private		<a href="http://www.brown-fieldy.cz/">http://www.brown-fieldy.cz/</a>		
<b>Cyprus</b>					
Department of Lands and Surveys	Government Department	CG,	Topo Map Series	€66.5Mill	
		LG, Prop, Uti, Tra, Env, Def, Tel	Cadastral Plans Road Maps Hydro data & maps		
Department of Geological Survey	Government Department				
Statistical Service of Cyprus	Government Department			€ 35.000	
Cyprus Telecommunication Authority	Semi-Government Organisation	CG,	<a href="#">CYTANET NetRunner Web</a>		
		LG, Prop, Uti, Tra, Env, Def, Tel	<a href="#">connectivity Web hostina</a>		
Electricity Authority of Cyprus	Semi-Government Organisation				

## D 3.3 Customer Cost/Benefit Analysis

Department of Information Technology Services	Government Department				
<b>Denmark</b>					
Kort & Matrikelstyrelsen  (KMS)  National Survey and  Cadastre	Public Sector Body	CG, LG, Env, Uti, Tra, Tele, Ems, Edu, Ret, Fin, Def, Prop	KMSTrans Spot-FM / NAV-DK WEB-Cadastre KortIO/vector Nautical Publications Aerial Photos	€37.1 Mill (2002)	434 (2002)
COWI A/S (incl. Kampsax)	Limited Company			€231 Mill (mostly non GI)	2400
				Kampsax €54.8Mill (Not all GI)	(mostly non GI)
					Kampsax 500 (Not all GI)
BlomInfo A/S	Limited Company (HQ Norway)				49 in Denmark 250 global
Informi GIS A/S	Limited Company				45
Geodata Danmark I/S	Owned by 54 municipalities				50
Scan kort A/S	Limited Company				30
Carl Bro Gruppen	Limited Company			€296,000 (Not all GI)	3000 (Not all GI)
<b>Estonia</b>					
Estonian Land Board	Gov Dept Ministry of Environment	CG, LG, Env,	Estonian Basic Map,  Estonian National  Topographic Database  Cadastral Information  System	€5.2 Mill (2001)	234 (2003)

## D 3.3 Customer Cost/Benefit Analysis

			Estonian Soil Map		
Estonian Map Centre	100% state owned	CG, LG, Env	Producer of Estonian Base Map and Basic Map;  Digital orthophotos  1:2000 and 1:10 000;  Photogrammetry		22 (2003)
Regio Ltd	PLC	Tel, Ems, Tra.Uti, Prop, LG Con	Database of Urban Areas 1:5000;	€1.5 Mill (2000)	60 (2003)
			Estonian Database 1:50 000;		
			Address Points;		
			Estonian Census Map;		
			Public map servers;		
			Road Atlas of Estonia;		
			Location-based services;		
E.O.Map Ltd	PLC	CG, LG, Env	<a href="#">Road atlas of Estonia 2002/2003</a> <a href="#">Map of Estonia</a> Web Maps vector & raster data		71 (2003)
<b>Finnland</b>					
National Land Survey of Finland	Government Organisation	CG,Env,Uti, Ret,Tra,Def, Tel, Fin, Forestry	<a href="#">MapSite</a>	€46,5Mill (2002)	1855(2002)
			<a href="#">Maastotietokanta</a>		
			<a href="#">Kiinteistorekisteri</a>		
			<a href="#">Diairoad</a>		
			<a href="#">SLICES</a>		
			<a href="#">Iima- ja ortokuvat</a>		
			<a href="#">Maastomalli</a>		

## D 3.3 Customer Cost/Benefit Analysis

Association of Finnish Local & Regional Authorities	Association of Regional Government	CG, LG, Tra, Uti, Env			
Geological Survey of Finland	Government  Research Institute	Prop, Env, Uti, Edu, LG	Maaperakartta 20/50 000, Kallioperakartta 200 000 Geokartta Active Map Explorer Geologinen retkeilykartta Geoimage	€48,2Mill (2002)	809 (2002)
Finnish Environment Institute (SYKE)	Government  Research Institute		Land Cover Corine2000 River (+lake) network Natura2000 Snow extent Water quality	€36.8Mill (2002)	598 (2002)
FM-Kartta	PLC	CG, LG, Tra	<a href="#">Aerial photoqraphs</a>		
Genimap Corporation	PLC	CG, LG, Uti, Prop, Tra, Ems	Maastotietokanta Kiinteistorajakartta GT Kartta 200 000	€12Mill (2002)	110 (2002)
<b>France</b>					
Institut Geographique National IGN-France	Publicly-owned establishment related to administration	CG, LG, Uti, Tel, Ret, Tra, Edu, Con, Fin, Def, Hea, Prop	<a href="#">RGE-BDTopo</a> RGE- BDParcelaire RGE-BDAdresse  <a href="#">RGE-BDOrtho</a> <a href="#">BDCarto</a> <a href="#">Geo route</a> <a href="#">BDAlti</a> <a href="#">GeoFLA</a> Raster databases	€118.5 Mill (2002)	1798(2002)

## D 3.3 Customer Cost/Benefit Analysis

			les services en ligne		
Direction Generale des Impots (DGI) (The French Cadastre)	Min of Fin	CG, LG, Uti, Tel, Ret, Tra, Edu, Con, Def, Prop	Cadastral data		7.500
EADS-S&DE-ISR-geomatics (HQ Germany) + FLEX-IMAGE	PLC	Env, Def, Uti, Edu, CG, LG	HotSpots <sup>TM</sup> ISTAR OPTIS, GeoGrid		300
GeoConcept SA	Societe Anonyme	CG, LG, Def, Ret, Edu	ESSENTIAL	€6,8 Mill (2002)	70 (2002)
			STREETS		
			ESSENTIAL		
			COMMUNES		
			ESSENTIAL		
			IRIS-2000.G5		
ESRI-France	PLC	CG, LG, Uti, Tel, Ret, Tra, Edu, Con, Fin, Def, Hea, Prop	ArcGIS family ERDAS GEOROUTE Raster. CS Raster	€14.3 Mill	110 (2002)
			ArcData, INSEE, Panorama, Mediapost	-2002	
				+ €0.7 Mill for Cartosphere	
Claritas	PLC	CG, LG, Uti, Tel, Ret, Tra, Edu, Con, Fin, Def, Hea, Prop	MapInfo AddressMap® Les Franciemes®	€23 Mill (2002)	130 (2002)
Intergraph France	PLC	CG, LG, Uti, Tel, Ret, Tra, Edu, Con, Fin, Def, Hea, Prop		€38 Mill <sup>16</sup>	60

## D 3.3 Customer Cost/Benefit Analysis

Wanadoo	PLC		<a href="http://Mappv.com">Mappv.com</a>	€11.3 Mill (2002)	75
Apic S.A. (subsidiary of Star Informatic S.A., Belgium)	PLC	Util, CG, LG, Env, Agr,	<a href="#">Apic4 Apic Shift</a>		
Spot Image	Societe Anonyme	CG, LG, Uti, Tel, Ret, Tra, Edu, Con, Fin, Def, Hea, Prop	<a href="#">SPOT Imaaerv</a> <a href="#">SPOTView</a>		
Planfax		Con, Tra, Edu	<a href="http://www.1bis.com">www.1bis.com</a>	€2.0 Mill 17 (2002)	60 (2001)
Generale d'Infographie		CG, LG, Env, Agr,	<a href="#">Giris, Lilis, Saqa</a>		
			<a href="#">PropGeo</a>		
			<a href="#">Clicad</a>		
Geosys		CG, LG, Env, Agr,	<a href="#">Mona ProEurope</a> <a href="#">Geosvs Data</a>		
SCOT		CG, LG, Env, Agr, Tra, Uti	<a href="#">Geonline</a>	€5 Mill (2002)	50 (2002)
GDTA			RS Training		
Maporama					
Webraska	PLC	Tra, LBS	SmartZone		
<b>Germany</b>					
DDGI: German Umbrella Organisation for Geoinformation	Association				
Bundesamt fur Kartographie und Geodasie (BKG)	Governmental Agency under the federal Ministry of Interior	CG, LG, Tra, Uti, Tel, LBS, Def		€1 Mill (budget approx €25 Mill)	300 (2003)
ESRI	private	CG, LG, Tra, Uti, Tel, LBS	ARCInfo ARCIMS	€15 Mill	80
Intergraph	private	CG, LG, Tra, Uti, Tel,	GeoMedia		
Deutsches		CG, LG, Uti,		€450 Mill	5



## D 3.3 Customer Cost/Benefit Analysis

Fernerkundungsdatenzen- trum (DFD)		Tel, Def		(small % for GI)	(small % for GI)
Infoterra	private	CG,LG,Tra, Uti, Tel, Env	IKONOS Landsat SPOT <a href="#">Orbview-3</a>		
Netsolut GmbH	private	CG,LG,Tra, Uti, Tel, LBS	<a href="#">portalMap24</a>		
			<a href="#">businessMao24</a>		
			<a href="#">businessMap24</a>		
			<a href="#">Easy</a>		
			<a href="#">mailMap24</a>		
			<a href="#">link2Map24</a>		
			<a href="#">freeMao24</a>		
digital data services gmbh (dds) <a href="http://www.ddsgeo.de/">http://www.ddsgeo.de/</a>	private		Geodate, Sozioökono- mische Daten, Softwa- re/Tools	€1,6 Mil	12 (2013)
GeoContent <a href="http://www.geocontent.de/">http://www.geocontent.de/</a>	private		TopView.data	n.V.	30
geoXtend – Ihr Partner für räumliche Planung und Analyse <a href="http://www.geoxtend.com/">http://www.geoxtend.com/</a>	private		Map Intelligence (soft- ware), Geodaten und Markdaten	€2 Mil	n.V.
GDV GeoSoftware  <a href="http://www.gdv.com">http://www.gdv.com</a>	private		Entwicklung von Soft- ware für die Geoinfor- matik und deren Instal- lation; Softwareschulun- gen	€1,5 Mil	15 (2013)
IMMO-Data AG - Software für die Finanz-und Immobili- enbranche  <a href="http://www.immodata.de">http://www.immodata.de</a>	private		Modulare software for Finance and Real Es- tate Sectors	€0,4 Mil	7 (2013)
Megatel <a href="http://www.megatel.de/">http://www.megatel.de/</a>	private		Yellow pages	€3.200 tsd (2011)	50 (2013)

<a href="http://www.landesplanung-hessen.de/">http://www.landesplanung-hessen.de/</a>	Hessisches Ministerium für Wirtschaft Verkehr und Landesentwicklung		Landesentwicklungsplan + Regional plans can be downloaded and are offered as WMS to be integrated as external services into other applications	n.V.	n.V.
<b>Greece</b>					
Hellenic Military Geographical Service (HMGS)	Govt Dept	Def, CG, LG, Tra, Uti, Tel, Con, Env			
Hellenic Mapping and Cadastral Organisation (HEMCO)	Agency under the Ministry of Defence	CG, LG, Tra, Uti, Tel, Def, Prop, Con, Env	<a href="#">GIS Data</a>	€0.3Mill revenue (budget approx €5.5 Mill)	
The Ministry of Agriculture - Dept of Surveying Dept of Forests & Natural Environment	Govt Dept	CG, LG, Tra, Uti, Tel, Def, Prop, Env			
The Institute of Geology and Mineral Exploration (IGME)		Env, CG, LG, Tra, Uti, Tel			
National Statistical Service of Greece	Govt Dept	Con, CG, LG, Tra, Uti, Tel	<a href="#">Dialital</a> <a href="#">Cartographic Data (DCD)</a>		
Ktimatologio S.A.	Private Company 100% owned by Ministry of Environment, Physical Planning and Public Works	CG, LG, Tra, Uti, Tel, Def, Con, Env	<a href="#">Hellenic Cadastre</a>		
Marathon Data Systems	PLC	CG, LG, Tra, Uti, Tel, Def	<a href="#">ESRIGIS</a> ESRI IMS		

## D 3.3 Customer Cost/Benefit Analysis

GEOAPIKONISIS Ltd	PLC	CG, LG, Tra, Uti, Tel, Def	Photoarammetrv Re- mote Sensing GIS Ca- dastre		
<b>Hungary</b>					
Institute of Geodesy, Carto- graphy and Remote Sens- ing (FOMI)	Government Dept	CG, LG, Ret, Env, Edu, Uti	DTA100 K. DTA10K Cadastral maps COR- INE TAKAROS Aerial photo EL DDM Geo- detic points	€10.3 Mill (2002)	152(2002)
MoD Mapping Co	Government Dept	CG, Def, LG, Ret, Env, Tel	1:50K digital, 1:25-250 K analoaue map 1:20K- 1:40K aero photos DTM	€6.4 Mill (2002)	160 (2002)
Hungarian Geodetic and Mapping Company Ltd	Government  Dept Company	Sdev, Agr, Env, Edu, Uti,	Cadastral Maps, Ortho- photo, Public Utilities Mapping and registra- tion, Land Surveying	€6.0 Mill	320
Cartographia Ltd	PLC	Ind.		€5.1 Mill	136 (2002)
FlexiTón Kft	PLC	CG, LG, Tel, Edu	ARIADNE TERKEPTAR Context	€3.3 Mill (2002)	56 (2003)
Geometria Ltd	PLC	CG, LG, Tel, Uti	GTT. SGM, Mirtusz	€3.3 Mill (2002)	80 (2003)
VARINEX Informatics, Inc	PLC		Autodesk 1:50K, 1:100K digital maps Ad- dress and Post codes DTM Geomark	€2.4 Mill (2002)	22 (2002)
Geoviw Systems Kft	PLC	LG, Uti, Tel, Emg, Env,	DC, GL GISTools, Greenline MAP server, ArINFO etc.	€2.3 Mill (2002)	34 (2002)

## D 3.3 Customer Cost/Benefit Analysis

graph IT Ltd	PLC	Tra, Tel, Uti, Fin, CG, LG, Def,	Budapest 1:4k National Road Network GIS Database 1:200K Address Matching Inter-graph GeoMedia Route-R	€2.1 Mill (2002)	18(2002)
piLINE Software Development Ltd	PLC	GIS development for high pressure pipelines and around	<a href="#">NYIR Pipeline Inf System: PRISMA Frame System: PipeDvnSeq</a> <a href="#">MovinaMap</a>	€1.5 Mill	25
Kommunalinfo Inc	PLC	Ind, tel, Uti	BP 500 DTA, SDTR Utility maps, Address gazetteer	€1.4 Mill	74 (2002)
HungaroCAD Information Ltd	PLC	LG, Tel, Env, Uti, Ret	MaspGuide Autodesk	€1.3 Mill (2002)	14(2002)
ESRI Hungary Ltd	PLC	CG, LG, Def, Edu, Ems, Env, Cri, Tra, Ret	ESRI Products	€1.2 Mill (2002)	20
Eurosense Ltd		Ind. Env	Digital orthophotomaps of Hungarian settlements	€1.2 Mill	20 (2002)
Datakart Geodezia Kft.	PLC	Ret, Env, Prop Env, Edu	1P Softwares (communal GIS) OKA street databank	€1 Mill (2002)	52 (2002)
ALFOLD-GIS Information Ltd		CG, LG, Def, Edu, Ems, Env, Cri, Tra, Ret	Micro Atlas-J MicroCity-J FireGIS Garmin GPS	€0.6 Mill (2002)	7 (2002)
DigiKom Ltd. Surveying and GIS	PLC	LG, CG, Con	GI software applications	€0.4 Mill.	14

## D 3.3 Customer Cost/Benefit Analysis

DigiTerra Information Services Ltd.	PLC	Ret, Env, Edu	DigiTerra MAP DigiTerra FIS Forestry 1 DigiTerra Explorer	€0.3 Mill (2002)	6 (2002)
<b>Iceland</b>					
The Agricultural Research Institute,					
Hnit. Hf	Private Company	CG, LG, Uti, Tel, Env, Def	Consultancy GI implementation data	€4.6Mill (2001)	50 (2003)
Loftmyndir ehf					
National Land Survey of Iceland	Gov Agency	CG, LG, Uti, Tel, Env, Def	Raster and vector data 1:25k to 1:1 Mill Air photos <a href="#">Maps of Iceland</a> <a href="#">Flvina over Iceland</a>	€662,500 (2002)	35 (2002)
The Reykjavikurborg GIS	Municipal Authority	Con, LG, Uti	<a href="#">Landupplvísnaakerfi Boraarvefsia</a>	€558,000 (2002)	7,284 (200)
The Icelandic Meteorological Office					
Icelandic Institut of Natural History					
Landsiminn					
National Energy Authority					
Public Road Administration,					
Isgraf ehf	Private Company		Intergraph Bentley		
Samsyn ehf	Private Company		Arc IMS ArcInfo Arcview		
<b>Ireland</b>					
Ordnance Survey of Ireland - OSi Suirbheireacht Ordnaís Eireann	NMO (Min of Fin)	CG, LG, Def, Edu, Ems, Env, Cri, Tra, Ret, Con	<a href="#">Leisure Maps Guides</a> <a href="#">Atlases Digital Data</a> <a href="#">PLACE Air Photos Geo-Directorv</a>	€8.5 Mill Revenue €15.9 Mill budget (2002)	302 (2003)
The Land Registry					

## D 3.3 Customer Cost/Benefit Analysis

Irish Central Statistics Office (CSO)	National Agency Gov Dept	CG, LG, Edu, Ret, Con	DataBank Direct		
The Geological Survey of Ireland		Env, Con, Uti, Prop, Con, Edu, CG, LG	Web Mapping		
Heritage Service of Ireland (Duchas)		Con, Edu, Env, CG, LG	SAC. SPA. NHA Canals Nature Reserves		
ERA-Maptec Ltd	PLC	Env, Con, Uti, Prop, Con, Edu, CG, LG	Ireland Vector Landsat SPOT CORINE		
GAMMA Ltd	PLC	Env, Con, Uti, Prop, Con, Edu, CG, LG	OSi Products Addresses INCA		
Paradigm Technology	PLC	Env, Con, Uti, Prop, Con, Edu, CG, LG	Autodesk Microstation		
ESRI Ireland	PLC	Env, Con, Uti, Prop, Con, Edu, CG, LG	ESRI GIS/IMS etc		
<b>Italy</b>					
Istituto Geografico Militare Italiano (IGMI)	Ministry of Defence	CG, LG, Uti, Tel, Env, Def, Con, Edu	Raster products Vector products		
Agenzia del Territorio (Cadastral Agency)	Ministry of Economy and Finance	CG, LG, Uti, Tel, Env, Prop, Con	Services for the Citizen Services for the Professional		
The Istituto Idrografico della Marina (MM)	Ministry of Defence	CG, LG, Uti, Env, Def	ECDIS Nautical Charts		250
L'Istituto Nazionale di Statistica		CG, LG, Uti, Edu, Env, Con	Statistical Products and Services		
Eurimage	PLC	CG, LG, Uti, Tel, Env, Def	Landsat Quickbird		

## D 3.3 Customer Cost/Benefit Analysis

			Ikonos		
Planetek Italia s.r.l.	PLC	CG, LG, Uti, Tel, Env, Def	CartOnet	(Company funds €88k)	41 (2002)
<b>Lithuania</b>					
National Land Service (NLS)	Gov Dept	CG, LG, Def, Env, Tel	Digital Topographical Maps,  Topographical DB Aer- ial photos  1:200k DEM		50
State Enterprise Centre of Registers	Gov Dept	CG,LG, Prop	Land Cadastre DB		
			Admin Units		
			Streets and addresses DB		
Ministry of Environment	Gov Dept	CG,LG, Env, Hea	Hydrography DB		
			Environmental observa- tions		
National Geological Survey	Gov Dept	CG, LG, Ret	Geological Databases, GIS GEOLIS Geoindic- ators		
National Forestry Institute	Gov Dept	CG, LG, Prop	GI of forest parcels  Forest inventory  DB		
<b>Luxembourg</b>					
Administration du Cadastre et de la Topographie (ACT)	Gov Dept	CG, LG, Uti,	Topographic maps  Gazetteer /street names  Orthophoto  DEM	€2,7 Mill (budget 2003)	128
Ministere de l'Environ- nement	Gov Dept				
DATUR	Gov Dept				
Ponts et Chaussees					

## D 3.3 Customer Cost/Benefit Analysis

Forestry administration	Gov Dept	CG, LG,	Phytolux Hunting parcels Public forests	€24 Mill (budget 2003)	130
<b>Malta</b>					
Malta Environment & Planning Authority (MEPA)	Mapping Agency & Env' and Plan Agency		Map Server	€5.5 Mill (2002)	450 (2003)
				€242.4k-from revenue	
Malta Information Technology & Training Services Ltd (MITTS)	Gov owned PLC	CG			
Land & Public Registry	Gov Dept	Con,			
The Ministry for Resources and Infrastructure	Gov Dept				
<b>Netherlands</b>					
Kadaster	Self-Administering State Body since 1994	LG, CG, Con, Uti.Tel, Tra,Edu, Prop, Fin	GBKN cadastral registration A.C.N. RD kadaster-on-line	€176,4 Mill (2002)	2.373 (2002)
TeleAtlas	PLC	Con, LG, CG, Uti.Tel, Tra,Edu	Multinet Navshop	€78.3 (2002)	1850 (21 offices worldwide)
Alterra	Private	CG, LG, Env	Bonne kaarten GIAB, LGN, HGN soils, Aerial photo (2000,2003)	€50 Mill (2003)	650 (2003)
AND Products BV	Private	LG, CG, Con, Uti.Tel, Tra,Edu	AND Global Road Data Web Services Geo-Source Clavis Suite	€35.0 Mill	350 (2003)  Netherlands, UK, and India



## D 3.3 Customer Cost/Benefit Analysis

Topografische Dienst Nederland (TDN)	Gov Dept (MoD)	LG, CG, Con,  Uti.Tel,  Tra,Edu	<a href="#">ToplOvector</a> To p50 vector Top250vector Rasterbestanden	€10 Mill (budget 2003)	160 (2003)
LSV-GBKN	Public Private Partnership	CG, LG, Uti, Con	<a href="#">GBKN</a> : Larae scale base map	€3,1 Mill (see text)	4 (see text)
Rijkswaterstaat					
<b>Norway</b>					
Statens Kartverk (Norwegian Mapping Authority)	Public agency under Ministry of Environment	LG, CG, Con, Uti.Tel, Erne Tra,Edu, Def, Prop, Fin	Vector: Basemap, N50, N1000  <a href="#">N2000</a> . N5000  Raster: N50, N250, N1000  DEM  Gazetter	€13.7 Mill revenue (budget approx €75.5 Mill)	
Norge digitalt (Norway Digital) - only relevant for public sector	Norwegian SDI under Statens kartverk	All	All products made by public sector in Norway	NA	NA
MapSolutions AS	Private	Tra, Def, Erne, Con, Tra	<a href="#">ELVEG ELVEG route planner Nordic Map</a>	€1.15 Mill (2002)	14 (2003)
NGU		LG, CG, Con, Uti, Env, Edu,	<a href="#">Maponline</a>	€16.5 Mill <sup>62</sup> (2002)	200 (2002)
			<a href="#">Geoloical</a>		
			<a href="#">databases</a>		
The Norwegian Institute of Land Inventory (Norsk institutt for jord- og skogkartlegging, NIJOS)	Public Institute (Min of Agr)	LG, CG, Con, Uti, Tra, Edu, Env, Agr	National statistics on forest and cultural landscape resources Consulting <a href="#">Land-use and landscape information</a>		130
Statens Vegvesen	National Road Administration	CG, LG, Con, Tra, Env			

## D 3.3 Customer Cost/Benefit Analysis

Statistisk sentralbyrå (SSB) Statistics Norway	Gov Dept	CG, LG, Con, Tra, Env	Statistical Publications		900
Blom AS	Private	LG, CG, Con, Uti.Tel, Erne Tra,Edu, Def, Prop, Fin	CARTERRA	€16 Mill (2002) <sup>63</sup>	244
Norsk eiendomsinformasjon, NE	PLC owned by government	LG, CG, Con, Uti.Tel, Erne Tra,Edu, Def, Prop, Fin	Cadastre, detailed topographic and thematic maps and data.		
Nordeca as	Private	LG, CG, Con, Uti.Tel, Erne Tra,Edu, Def, Prop, Fin	Data broker of Norwegian datasets.		
Geodata AS	Private	All sectors	ESRI distributor in Norway		
<b>Poland</b>					
Head Office of Geodesy and Cartography (GUGiK)	Gov Dept	CG, Con, LG,Edu, Ret, Prop, Env, Uti			€ 50 (budget 2003)
The Polish Geological Institute (PGI)	Gov Dept	Env, Prop, CG,LG, Edu	HYDRO Bank GEIXS		
Chief Statistical Office (GUS)	Gov Dept	CG, LG, Con, Edu,Ret, Hea,Env			
Institute of Geography and Spatial Organisation - IG-iPZ	Gov Dept	Con, CG, LG, Edu, Tra			
GEOBID <sup>1m</sup> Ltd	PLC	CG, LG, Con, Edu,Ret,	OSRODEK		
			BANKOSNOW		

## D 3.3 Customer Cost/Benefit Analysis

		Hea,Env	EWMAPA		
			POWTAX		
			AKTUALTEL		
GEOSYSTEMS Polska, Ltd	PLC	CG, LG, Con, Edu,Ret, Hea,Env	ERDAS		
NEOKART GIS Ltd	PLC	CG, LG, Con, Edu,Ret, Hea,Env			
TatukGIS	PLC	CG, LG, Con, Edu,Ret, Hea,Env	Developer Kernel		
<b>Portugal</b>					
Institute Geografico Portu- gues (IGP)	Public Administration Institute	CG, Uti, Con LG,Edu, Ret,	SNIG Geocid	€10 Mill	360 (2003)
Institute Geografico do Ex- ercito (IGeoE)	Public Administration Institute		Topo 25k Topo 50k DTM		
Municipia SA	PLC				54 (2003)
Estereofoto, SA	PLC			€6.1 Mill (2002)	
NOVAGEO, SA	PLC				
<b>Romania</b>					
National Office for Ca- dastre, Geodesy and Carto- graphy (NMO)	Gov Dept				
Institute for Cartography, Photogrammetry, Geodesy and Cadastre (ICFGC),	Gov Dept				
Topography Military Depart- ment	Gov Dept				

## D 3.3 Customer Cost/Benefit Analysis

Geo Strategies S.A.	Private company registered in Cambridge UK, with a subsidiary company in Sibiu, Romania.	Tel, Def, CG, Ems, Ret, Tra, Env, LG, Fin	CEEGIS Gis Plus & Navigable GIS Address CEE Imagery DTM CEE	>€600,000 (2002)	21
			Boundaries & demographics interactive maps		
ESRI Romania	PLC	CG, LG, Uti, Tel, Ret	ESRIGIS ESRI IMS		
Intergraph Computer Services s.r.l	PLC	CG, LG, Uti, Tel, Ret	Intergraph		
ANIAP (National Association of the specialists in Informatique working in Public Administration):	PLC	CG			
Bucharest University, Faculty of Geology and Geophysics	Academic Institution				
<b>Slovak Republic</b>					
Geodetic and Cartographic Institute Bratislava	Govt Dept	CG, LG, Edu, Agr, Cri, Tra, Env, Tel, Hea	SVM 50 CD RE SVM 50 - roads SVM 50 - water areas, canopy SVM 50 - rivers SGD CS RE SKPOS	€1.9 Mill (2002)	286 (2002)

## D 3.3 Customer Cost/Benefit Analysis

Slovak Environmental Agency (SEA)	"Contributory organisation"	Env,CG,LG Edu	Civil and military maps, DEMs Protected areas, Admin districts, LAND-COVER Orthophotomaps, Thematic layers <a href="#">Environmental web map server</a>	€309,500 (2002)	303 (2002)
Slovak Road Administration	Govt Dept (non-profit)	Tra, Prop, CG, LG, Edu	Road Data Bank (RDB)  RDB information  Service, Traffic Engineering	Non-profit organisation	4,788 (2002)
Soil Science and Conservation Research Institute	Government institution	CG,LG, Env, Edu			114 (2002)
EUROSENSEs.r.o.	PLC (EUROSENSE HQ is in Belgium)	Def, CG,LG, Ret, Uti, Env, Tel	Central Georeferencing Database Land Id  Orthophotomaps Orthocoverage for IACS LPIS DTM/DSM country coverage flood simulations	€1.2 Mill (2002)	27 (2003)
Geodis Slovakia s.r.o.	PLC	Ret, Tra, Tel, LG, CG,Agr	Vector map, Orthophotomap, Landform Profile	€1.6 Mill (2002)	16 (2002)
Hydromelioracie, s.p.	State Enterprise	Env, CG, LG			108
Aurex s.r.o.	PLC	CG, LG,Tra, Prop, Env	Planning	€600,000 (2002)	18(2003)

## D 3.3 Customer Cost/Benefit Analysis

GeoModel s.r.o.	PLC	Tel, Env, Uti, Edu	Land cover/land use data DTMs	€100,000 (2002)	3-5 (2002)
ErasData Pro	PLC	CG, LG, Ems,			17
ISAXs..r.o.	PLC	LG, CG, Prop, Tra	Spatial Planning	€83,500 (2002)	4
<b>Slovenia</b>					
Geodetska uprava Republike Slovenije Surveying and Mapping Authority of the Republic of Slovenia	Government Dept	CG, LG, Uti, Prop, Env, Con, Ret, Def		€17.6 Mill (2002)	574 (2002)
IGEAd.o.o.	PLC	CG, LG, Uti, Prop, Env, Con, Ret, Def		€320,000 (2002)	25
<b>Spain</b>					
Instituto Geografico Nacional (IGN)	Gov dept, part of Min of Public Works and Transportation	CG, LG, Uti, Prop, Env, Con, Fin	<a href="#">Vector/Raster Data</a> National Topographical Map National Atlas Astronomical Almanac	Budget, approx €30	561
Centro Nacional de Informacion Geografica (CNIG)	Autonomous body of Min of	CG, LG, Uti,	<a href="#">Vector/Raster Data</a>	€3 Mill Revenue	54
	Public Works & Transport	Prop, Env,	National Topographical Map		
	linked to the IGN	Fin, Con, Ret	National Atlas Astronomical Almanac		
Direccion General del Catastro	Gov Dept -	CG, LG, Uti,	<a href="#">Aerial photographs</a>	€107 Mill	3
(General Directorate of Cadastre)	part of Min of Finance	Prop, Env,	<a href="#">Orthophotographs</a>	(budget 2003)	-2.003

## D 3.3 Customer Cost/Benefit Analysis

		Fin, Con, Ret	<p>Paper-printed cartography (urban and rural)</p> <p>Digital cartography (urban and rural)</p> <p>Digital alphanumeric information (urban and rural)</p>		
Institut Cartografic de Catalunya	Public	CG, LG, Uti,	Vector/Raster		
(ICC)	Enterprise of Regional Gov of Catalonia Dep of Public Works	Prop, Env, Con, Fin, Ret	<p>data</p> <p>Catalonial</p> <p>Topographic Map</p> <p>Orthophotographs</p>		
Institut Cartografic de Andalucia	Public	CG, LG, Uti,	Vector/Raster		
	Enterprise of Regional Gov of Andalucia Dep of Public Works	Prop, Env, Con, Fin, Ret	<p>data</p> <p>Andalucia</p> <p>Topographic Map</p> <p>Orthophotographs</p>		
Institut Cartografic de Valenciano	Public	CG, LG, Uti,	Vector/Raster		
	Enterprise of Regional Gov of Valenciano Dep of	Prop, Env, Con, Fin, Ret	<p>data</p> <p>Valenciano</p> <p>Topographic Map</p> <p>Orthophotographs</p>		

## D 3.3 Customer Cost/Benefit Analysis

	Presidency				
TRACASA	Public enterprise of Reg. Gov. of Navarra	CG, LG, Uti, Prop, Env, Fin, Con, Ret	Vector/Raster data Navarra  Topographical Map Ortophotographs		
GRAFCAN	Public enterprise of Reg. Gov. of Canary Islands	CG, LG, Uti, Prop, Env, Fin, Con, Ret	Vector/Raster data Canary Islands  Topographical Map Ortophotographs		
ESRI Espafia	PLC	CG, LG, Uti, Prop, Env, Con, Fin, Ret	ESRI GIS/ IMS ERDAS		
Intergraph	PLC	CG, LG, Uti, Prop, Env, Con, Fin, Ret	GeoMedia		
Netmaps,SA	Private Com- pany		Digital Maps	€195k	
<b>Sweden</b>					
Local Authorities (in co-op- eration with the Swedish Association of Local Au- thorities)	Local Gov	LG/Con		About €200M	About 3000 in 290 municipalit- ies
Lantmateriet	Gov Agency	CG, LG, Uti, Prop, Env, Con, Fin	GSD	€161M (2002)	2074 (2002)
			Road Map		
			CORINE		
			Imagenet		
			Geoimager		
			Mapmate		



## D 3.3 Customer Cost/Benefit Analysis

Geological Survey of Sweden	Gov Agency	CG, LG, Env	Georegister Geochemical	€27M (2002)	290 (2002)
Swedish Maritime Administration	Gov Agency	CG, LG, Tra, Con	Nautical Charts Mapmate	€155M (2002)	1250 (2002)
Teleadress	PLC	CG, LG, Ret, Fin	Teleadress		
			Komplement		
			Teleadress		
			DM/TM		
			Teleadress		
			Intervall		
			Teleadress		
			Online		
			Teleadress		
			Kataloa		
			Teleadress		
			Kartdata		
			Teleadress		
			Marknadsund.		
Trimble	PLC				
Swedish Meteorological and Hydrological Institute	Gov Agency	CG, LG, Env	Baltex Climate Data	€50 M (2002)	550 (2002)
Swedish National Road Administration	Gov Agency	CG, LG, Tra, Con	Road Map Accident data	€1900M (2002)	6500
<b>Switzerland</b>					
Swisstopo - Federal Office of Topography	Government	CG, LG, Uti,	VECTOR25 /	€21.1 Mill (2002)	265 (2002)
	Dept.	Tra, Env, Ret, Tel	VECTOR200 Swiss-Names Ortho aerial photos		
			SWISSIMAGE DHM25 (25m) / DTM-AV and DOM-AV GG25		
Bundesamt fur Statistik	Government	CG, LG, Uti,	STATWEB		500 (Estimated average 2003)
	Dept.	Tra, Env, Ret, Tel	GEOSTAT		
ESRI Geoinformatik AG	PLC	CG, LG, Edu	ArcGIS		16

## D 3.3 Customer Cost/Benefit Analysis

(HQ Redlands, USA)					-2003
Intergraph (Schweiz) AG	PLC	CG, LG, Uti,	GeoMedia	€3.6 Mill	20
(HQ Huntsville, USA)		Edu, Prop	GeosPro		
C-plan AG	PLC	Uti, LG, CG	TOPOBASE	€9.1 Mill	62 (29 in Germany)
GEOCOM InformatikAG	PLC	CG, LG, Uti,	GEONIS ArcGIS	€7.8 Mill	40
		Edu, Prop	ArcSDE with Oracle	-2002	-2002
Endoxon AG	PLC	CG, LG, Uti, Tra, Env, Ret, Tel	DOM 10		50
			Flytastic		
			teleatlas,		
			navtech		
			geopost, active		
			consumer ASP		
			Geodata Server		
			Endoxon		
			mobidick.ch		
			Map Info		
NISAG	PLC	Uti, LG, CG	Stromfachscha		
Swissphoto	PLC	CG, LG, Uti,	Aerial photos	€13.0 Mill	140
		Tel, Prop	3D city models LIDAR . DEMs Land Surveys Engineering Surveys	(2002)	(2003)
Leica Geosystems		Prop, CG, LG, Def, Edu, Tra, Uti, Tel, Ret		€415 Mill	2370 (world-wide)
ITV Geomatik AG	PLC	CG, LG, Uti, Tra, Env, Prop	Consultancy		6
			Project		
			management		
Turkey					

## D 3.3 Customer Cost/Benefit Analysis

Ministry of Defence, General Commander of Mapping	Gov Dept				
Directorate General of Land Registry and Cadastre	Gov Dept				
General Directorate of Rural Services (GDRS)	Gov Dept				
Chamber of Surveying and Cadastre Engineers					
State Institute of Statistics (SIS)	Gov Dept				
ISLEM Geographic Information Systems Engineering and Education Ltd (ISLEM GIS)	PLC	Env, Def, Agr, LG	Geographic Database of Turkey	€1.45 Mill (2002)	100 (2002)
			ESRIGIS		
			ERDAS		
			Leica		
			Landsat		
			Quickbird		
Graftek A.S.	Private Company	CG, LG, Prop	EGHAS Trimble	€83k	17
			MUTOH		
BORAT DIGITAL MAPPING SYSTEMS	Private Company		GeoCAD,		
			GeoGIS,		
			GeoKENT,		
			GeoMUHTAR		
			GeoiMAR		
			GeoPC		
Spaceturk	Private Company		Satellite imagery -IKONOS, SPOT		
United Kingdom					

## D 3.3 Customer Cost/Benefit Analysis

Ordnance Survey	Gov Agency	CG,LG,Uti,Tel,	OS MasterMap™. Land-Line®. Superplan Data®, Superplan® plots. Siteplan Data™ Aerial Photos. Land plan® OS Street View™. 1:10k Raster. 1:25k Raster 1:50k Raster. 1:50k Gazetteer. 1:250k Raster, Strategi® Meridian	€154 Mill (2002-03)	1746 (2002-03)
		Ret,Edu,Def,Env			
		Fin,Tra			
Ordnance Survey Northern Ireland	Gov Agency	CG, LG, Util, Tra, Env, Ret, Fin	COMPAS	€3.6 (2001-02)	178 (2001-02)
			POINTER		
			Large Scale Digital		
			Data		
			50K Vector		
			10K Vector Soil		
			DTM Boundaries		
Improvement & Development Agency for local government	Company limited by guarantee wholly owned by L Gov	LG, Prop, CG, Env, Con	NLPG NLIS NLUD NSG	€42.3 Mill (2001-02)	250
Landmark	Company	CG, LG, Env, Ret, Prop, Util	Envirocheck Sitecheck Promap Historical Maps	€29.7 (2002)	145 (2003)
Getmapping	PLC	Con/LG/CG	Millenium Map NEXT-Map Britain (reseller)	€4.87m (2002)	60 (2002)
GeolInformation Group	Company	CG, LG, Env, Ret, Prop, Util	Cities Revealed Counties Revealed Countries Revealed		20 (2003)

## D 3.3 Customer Cost/Benefit Analysis

Multi Media Mapping Ltd	PLC	CG, LG, Util, Tra, Env, Ret	<a href="http://multimap.com">multimap.com</a>		
BTex Ltd	PLC	Conl, Tra, Ret,	<a href="http://streetmap.co.uk">streetmap.co.uk</a>		
BKS Surveys Ltd	Wholly owned by Amalgamated Metal Corporation PLC	CG, LG, Env, Ret, Prop, Util			125 (2003)
Infoterra	PLC	CG, LG, Env, Ret, Prop, Util	TerraSAR Orthoview MAPS  Global Seeps QuickBird		

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- 4 Dataquest, Frost & Sullivan, International Data Corporation
- 5 Review on recent studies on PSI re-use and related market developments, Graham Vickery, Information Economics, Paris, 2011
- 6 <http://www.directionsmag.com/articles/daratech-reports-gis-revenues-forecast-to-grow-8-to-175-billion-in-2003-uti/123867>
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- 8 [geodata.ethz.ch/geovite/tutorials](http://geodata.ethz.ch/geovite/tutorials) - ETHZ, 2010
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- 10 Based on [http://en.wikipedia.org/wiki/List\\_of\\_international\\_architecture\\_schools#Europe](http://en.wikipedia.org/wiki/List_of_international_architecture_schools#Europe) List of international architecture schools
- 11 We consider around 10% of students will become researcher
- 12 We consider an average of 1500 students per school
- 13 Estimated by authors
- 14 Architects' Council of Europe, the Architectural profession in Europe, 2008.
- 15 Estimated by authors
- 16 Eurostat data (2009)
- 17 Estimated by authors
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- 23 Nordhaus WD. The value of information. In: Krasnow, RP, editor, Policy aspects of climate forecasting. Proceedings, May 4. Washington, DC: Resources for the Future;1986: p.29–34.
- 24 Wikipedia: Data Quality
- 25 Reference: Minutes of the plan4business Stakeholder Board meeting, Plzen
- 26 It may also be considered in how far the following cases are understood as part of the European spatial data infrastructure: 1. Data specification exists: Spatial objects that are not covered by one of the INSPIRE data specifications, but for which a full data specification has been developed by a community or project and which has been published in an appropriate register in the infrastructure.  
2. Limited documentation: Spatial objects or just map layers that are not or not fully described by any data specification, which is registered in the infrastructure. For example, some data files for which no

documentation exists, but which are made available through a View Service. The minimum documentation requirement for a spatial data set in the infrastructure is that it has to be possible to generate the required service descriptions to publish the data.

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- 32 More information is available here: <https://ec.europa.eu/digital-agenda/en/blog/eu-open-data-portal-here>
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