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A European Community  
of SMEs built  
on Environmental Digital Content  
and Languages

**Report on the market potential  
for Geo-ICT SMEs  
in relation to INSPIRE  
(short version)**

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Prepared by smespire project

**[www.smespire.eu](http://www.smespire.eu)**

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## 1. Background

This document is the short version of the “Study Report” of the smeSpire project available at [www.smespire.eu](http://www.smespire.eu)

This is the first study about Geo-ICT private sector at European level: it provides an in-depth analysis and comparison between private companies and how they relate to INSPIRE Directive ([inspire.jrc.ec.europa.eu](http://inspire.jrc.ec.europa.eu)); 299 companies participated in the survey from more than 18 countries in Europe; information about Geo-ICT companies and INSPIRE was also collected through 113 physical in-depth interviews (also involving INSPIRE National Contact Points as well as representatives from Legally Mandated Organisations and National Geographic Associations).

The INSPIRE Directive (2007/2/EC) establishes an Infrastructure for Spatial Information in Europe to support Community environmental policies and policies or activities which may have an impact on the environment. INSPIRE is based on the creation, operation and maintenance of infrastructures for spatial information established and operated by the 28 Member States of the European Union plus Switzerland, Norway and Iceland, addressing 34 spatial data themes related to environmental applications.

Making data available, according to INSPIRE standards, requires specific skill sets seldom found in public authorities. The management of this content represents an opportunity for Small and Medium Enterprises (SMEs) active in this sector. SMEs can enable countries to fulfil the Directive, creating new market opportunities with increased potential for innovation and new jobs. The technical skills and organizational flexibility of SMEs can effectively support the various institutions and stakeholders directly involved in the various commitments related to the implementation of INSPIRE. Due to legal requirements, the INSPIRE implementation becomes the entry-point for crucial business opportunities, opening new or reinforcing existing perspectives.

The smeSpire project is a Support Action for SMEs driven by a consortium of key players from 12 different Member States:

SMEs, research centres, environmental agencies, a public body and a non-profit association.

The purpose is to encourage and enable the participation of SMEs in the mechanisms of harmonizing and making large-scale environmental content available.



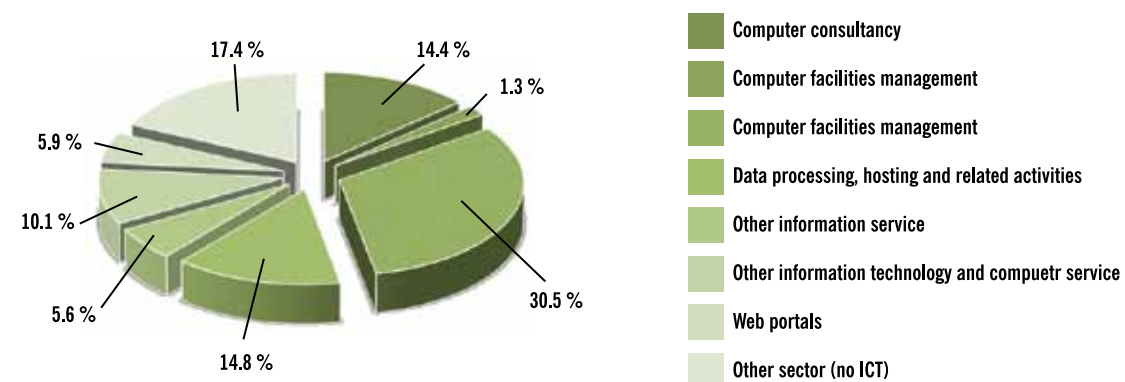
## 2. Markets, jobs, skills

There is no clear and agreed definition for Geo-ICT: the definition used in this study was restricted to GIS/geo-location activities rather than all activities that could fall within the INSPIRE regulations. Moreover, there is virtually no data on the size of the Geo-ICT SME sector in Europe or in individual Member States; from the studies that have been carried out in the past it appears that Geo-ICT may comprise 1-2% of the overall ICT sector.

This would lead to a very crude estimate of about 7,000 Geo-ICT companies in the EU28.

However, this figure could increase if a wider definition of Geo-ICT was used that covered companies involved in the creation, analysis and publishing of INSPIRE compliant data.

Most of companies surveyed regard themselves as “ICT” companies, and most are relatively young, with 90% created between 1988 and 2008. There is evidence that major technological developments have an effect on the creation of new companies.



Geo-ICT SMEs are generally involved in markets within their own Member State. The degree of involvement in wider EU business seems to increase with the size of the company.

The customer base is highly skewed to the public sector: in addition to direct contracts, Geo-ICT SMEs are often involved in sub-contracting depending on the degree of specialization of their skills.

Most Geo-ICT SMEs define their core business as “geospatial activities”: within this, data usage, client application development and data modelling/transformation are by far the most significant activities.

Geo-ICT SMEs fall within the “small” category in terms of number of employees (<50), but in the “micro” category in terms of turnover (<€2m). It may be that the type of work undertaken by Geo-ICT SMEs promotes more co-operative working practices.

It seems that having more employees is an advantage in that turnover in larger Geo-ICT companies is higher than would be expected based simply on comparative number of staff. More than 80% of the annual turnover of Geo-ICT SMEs comes from “geospatial activities”. Most of these relate to the use of

Figure 1.  
Companies by ICT  
sub-divisions (NACE)

82% of companies define themselves as “ICT”: the remaining 18% is focused on “Architectural and engineering” (8.5%), “Scientific and technical activities” (6.3%) and “Construction and civil engineering” (1.4%)

34% of companies were founded in the 1990s; 41% from 2000 to 2009; 12% after 2010. Almost 60% are “micro” with less than 10 employees

More than 30% are “small” with less than 50 employees; when considering the turnover, almost 75% are “micro” (less than €2 million), and only 2% are “small” (more than €10 million).

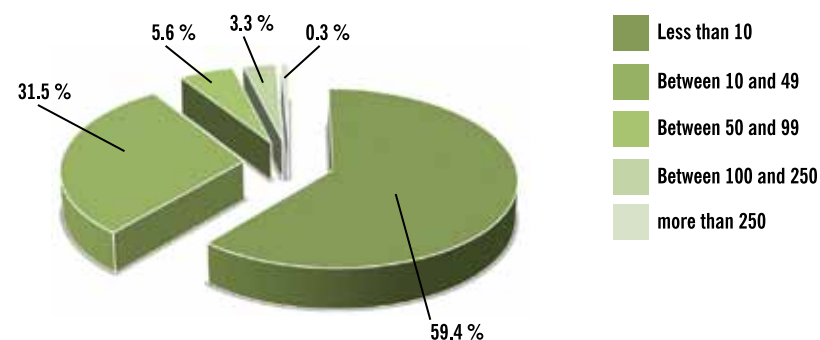


Figure 2. Companies by ICT sub-divisions (NACE)

spatial data, data modelling and development of client applications, although companies are involved in a range of activities in addition to these primary functions.

Involvement in EU funding is relatively low in Geo-ICT SMEs, but this reflects the position with overall ICT companies. Approximately one third of companies surveyed participated in some EU co-funded projects. Companies used a range of funding models, but most depended on payment for specified activities, the norm for public sector procurements.

Affiliation with national geographic associations seems more important to Geo-ICT SMEs than with ICT and SME associations. Therefore the “geo” aspect of their identity seems to be more important than the other elements. The approach to certification is variable, as is awareness of geographic standards and technical specifications. This appears to be a significant gap in the knowledge of Geo-ICT SMEs.

There is a much greater familiarity with Open Source Software, which reflects its increasing importance across Europe, together with the competence about Service Oriented Architecture (SOA). Approximately one third of companies are involved in formal standards certification schemes, and in general, familiarity with standards is relatively low.

OGC standards like Web Map Service (WMS) and Web Feature Service (WFS) are well known by companies, while on metadata (OGC CSW and EN-ISO19115/19139) and GML there is a need for improvement. WPS and SLD are still hidden and less known.

60% of companies base their revenue on public sector (mainly local or national governments)

40% of companies are ‘users’ of spatial information and 20% are involved in data modeling or data transformation  
27% of companies work primarily in developing client applications, while 6% develop network service solutions

30% of companies are ISO9000 certified: this is tightly coupled to public procurement procedures, seen as obstacle by ‘micro’ and ‘small’ companies due to costs and bureaucracy

60% of companies are very competent on Open Source Software; SOA is well known, while Resource Oriented Architecture (ROA) is not; mobile applications are still a challenge

### 3. INSPIRE

There is significant variation between Member States in the importance assigned to the implementation of the Directive and the co-ordination of activities: this variation is a factor in the diverse status of Geo-ICT SMEs studied.

Awareness of INSPIRE among Geo-ICT SMEs is, perhaps, lower than expected with more than one third of companies completely unaware of the Directive.

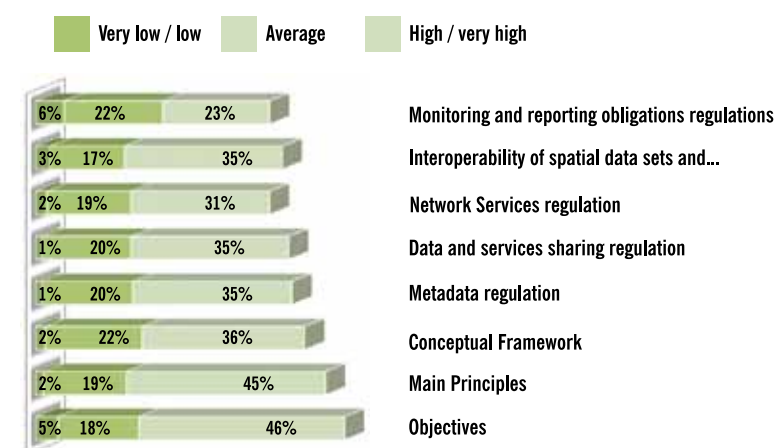


Figure 3. Level of knowledge of INSPIRE

Just one-third of companies are already involved in some INSPIRE-related activities.

General objectives and principles are well known; regulations about “Data” and “Network services” are less known.

Competences needed to implement INSPIRE are available at private sector level, covering the whole range of activities.

Companies are mainly involved in development of view services and data modeling (both more than 25%) and metadata catalogue (more than 20%).

Lowest involvement is on schema/data transformation (less than 10%) and test suite (12%).

Those that are involved tend to be aware of the general aspects of the Directive, but less familiar with the more detailed technical aspects. Only one third of Geo-ICT SMEs have a formal involvement with the INSPIRE process at European level. The organizations involved with INSPIRE cover the whole range of activities, however, there is some bias towards metadata and view services, presumably because these are the initial priorities of the public sector customers.

A wide range of INSPIRE data themes are covered by Geo-ICT companies; the main themes of interest seem at local level (e.g. land use, cadastral parcels, buildings, elevation, transport networks, addresses, utilities and government services). Provision of expertise to conduct analyses, syntheses or other added value knowledge on top of the INSPIRE data can be seen as a typical market for new business.

In general INSPIRE has had so far a relatively low impact on Geo-ICT SMEs, though some benefits have been realized through the introduction of new products/services, ways of working and new customers/markets as well as improved turnover. However, there is a great expectation that INSPIRE will contribute to growth in the future.

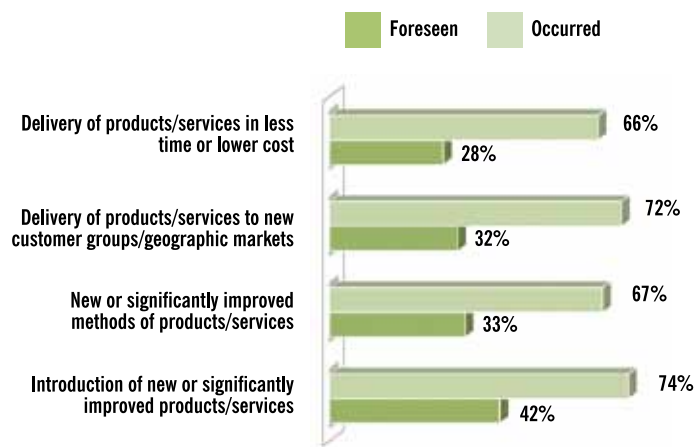


Figure 4. Impact of INSPIRE

Part of the reason for the low impact is that there are many barriers to Geo-ICT involvement in INSPIRE. These include budgets, awareness and competency and the scope of the Directive.

The study revealed a number of interesting observations that illustrate the limitations of INSPIRE with regard to the private sector. The overall picture is that there is a good participation by the private sector in the INSPIRE implementation as contractors and service providers. However, this involvement is limited by the availability of public sector finances.

A widespread and significant problem is the restricted access to public sector data either by restrictive licensing or lack of availability or publishing by public sector organizations: this significantly limits the development of value added services by the private sector.

There is a general view that INSPIRE can provide many potential benefits to the private sector. However, unless the funda-

Barriers to innovations mentioned by the Geo-ICT SMEs are:

> limited access to data: the licenses for re-use spatial data and the costs curb innovation

> difficulties in entering or participating in EU co-funded projects (due to the complexity of bureaucracy and time requested to prepare administrative documents)

mental barriers are removed, it is difficult to see how these benefits can be realized.

For both private companies and public organizations, INSPIRE's main benefit is its contribution to raising awareness about geographical information in general, while underlining the need for data sharing through interoperable data and services. This should increase the availability of (harmonized and interoperable) information and the quality of data provided.

According to many of the SMEs interviewed, INSPIRE is going to enhance National Spatial Data Infrastructures (NSDIs), and well-developed NSDIs means opportunities for the public and private sectors.

Common data models and interoperable network services to access data are the main strengths of INSPIRE, as seen by both the public and private sector.

However, the final goal for having interoperable and interchangeable geographic information is limited by the complexity of regulations and technical specifications, although in some cases such specifications are only extending international standards (i.e. ISO and OGC). Therefore, in principle, these specifications should be easy to implement even if they sometimes conflict with widely used de-facto standards.

There is a strong need to support training modules and consultations about skills and knowledge improvement (mostly for "INSPIRE beginners"). A second main challenge is to make technical documentation clearer and easier where possible. Effort should also be targeted to support joint ventures between private companies and the academic sector. These should link research with application in practice, establishing and enlarging networking and capacity building activities with transnational scope. The objective of these initiatives should be to share and effectively utilize particular expertise via international projects, experts exchange stages, workshops and training.

There is a need for establishing and enlarging networking and capacity building activities with transnational scope in order to share and effectively use particular expertise via international projects, exchange of experts, workshops and training modules.

## 4. Innovation

Little innovation was carried out by Geo-ICT SMEs: even where it is carried out budgets for innovation and R&D are low (<10% of annual budget).

Few companies have formal structures in place to promote innovation; however, collaboration with peers is an emerging strategy for some companies, particularly those working in Open Source Software, with a good level of knowledge about Open Source Software: this reflects the increasing importance of Geographic Free Open Source Software (GFOSS) as a real European asset.

Compared with the wider SME sector, Geo-ICT SMEs have little involvement with innovation and R&D co-funded projects: only one-third participate in some EU programs (FP7, ERF, LIFE+, CIP, etc.).

Even when engaged in innovative practices, effort within companies is low. It may be that a key reason for this is the large



Geo-ICT SMEs in EU co-funded programs:  
 - 20% in FP7  
 - 10% in ERDF  
 - 7% in LIFE+  
 - 6% in CIP-PSP

Only 14% of the overall EC budget for ICT FP7 projects was received by SMEs, while 21% went to Large Enterprises (2007-2011) (1).

Almost half of companies see the dominance of the market by established enterprises as the main barrier.

Up to 16% of public procurements is by brand name, with European public authorities spending unnecessarily some €1,1billion per year (2).

Figure 5. Partnerships in FP7-ICT projects

(1) <http://open-data.europa.eu/en/data/dataset/ict-research-projects-under-eu-fp7>

(2) <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=SWD:2013:0224:FIN:EN:PDF>

scale dependence on the public sector which is traditionally seen as risk and innovation averse. The small share of money co-funded is another relevant factor.

Conversely, customer demand can be a key factor in encouraging Geo-ICT SMEs to innovate. The main barrier for many companies is by far the domination of the market by larger established companies (often large ICT brands) usually tightly coupled to the 'vendor lock-in' issue .

This leads to exclusion from public sector procurements and tendering: the increased use of Open Source Software by public sector customers could help to address this problem.

Recent studies also demonstrated that the release of public sector data as Open Government Data has a practical direct impact on increased entrepreneurial activity: many IT-start-ups and established companies have a significant interest in (and willingness to pay for at a marginal cost) public sector information. Therefore, Open Data is a potential catalyst and enabler for innovation through stimulating viability ensuring funding, providing information about potential markets, and decreasing cost-time in the exploitation of R&D projects.

### > Key Findings

There has already been a slight improvement in productivity, reflected in a change in turnover in a number of Geo-ICT SMEs, also thanks to INSPIRE; however, the main benefits have yet to be realized, with most companies expecting to see new market opportunities through increased demand for new data and software based services.

> Overall, INSPIRE is not considered innovative by SMEs, and consequently it is having a low impact on innovation. Several things have to change if INSPIRE is to stimulate and enhance innovation;

> there must be pragmatic solutions for SMEs to participate, through the enforcement of open data and e-government, with new business models that can be developed;

Open data can unlock some €800 billion in economic value annually across transportation, €400 billion across electricity and €300 billion across oil and gas (source: McKinsey).

> publicly available data improve customer service and thus contribute to innovation: the more data available to organizations and people, the more demand is created for the SMEs' services and solutions;

> public authorities are asking for INSPIRE-compliant solutions, but too often call for tenders suffer from insufficient and heterogeneous details about technical requirements for being "INSPIRE-compliant";

> the main opportunities for the near future are seen at data and metadata levels;

> INSPIRE's impact needs to shift from "technology" (software for serving, presenting and applying data) to "content"; at software level opportunities are expected more for desktop clients than geoportal/services;

> data transformation/harmonization can be a big challenge and business opportunity for private companies; the main concern is that data modelling activity is often "hidden" and not fully recognized both inside and outside the organization, so difficult to finance;

> test suites for data and web services for validation are not yet taken seriously into consideration. The biggest interest should be around download services, but these should be "open services" for downloading "open data"; transformation services are interesting mainly for professional and high-skilled users (again, this implies lowering constraints on use and access of data).

## 5. Recommendations

### > For further research

There is still the need to have a clear definition of European Geo-ICT SMEs; at the same time, it is also crucial to continue and improve this study on Geo-ICT private companies, covering all EU28 area and targeting a broader generalization of INSPIRE

activities, towards a wider location context, independent of the thematic sector. The following recommendations are provided for further researches on Geo-ICT:

> agree a definition of Geo-ICT SME that reflects the existence of companies that create and use INSPIRE compliant data but do not regard themselves as traditional GIS companies, so extending the definition used in this study to better cover SMEs involved in all aspects of the data related to the INSPIRE Regulations;

> as a matter of urgency establish accurate figures for the Geo-ICT SME sector, repeating and enlarging the study undertaken and taking into account the wider definition, and defining a set of possible indicators to cluster Geo-ICT SMEs;

> continue and improve this research with a strong focus on INSPIRE extension for e-government and within a broader cross-sector interoperability framework for the exchange and sharing of location data and services;

> investigate current status and potential of clustering effects for Geo-ICT SMEs, with regard to the benefits of co-operation in Geo-ICT activities.

### > For changes in policy and approach

Given the predominance of public sector administrations in the customer base of Geo-ICT SMEs, encourage Member States to promote better links between public and private sectors. The following recommendations are provided regarding changes and improvements in policy and approach:

> The public sector to actively involve private companies in all phases of the INSPIRE implementation, so to realize the potential benefits of INSPIRE and to scope opportunities for innovation;

> Greater co-operation between public and private sectors needs to include development of better knowledge of INSPIRE requirements in public administration procurements;



> European Commission and Member States to jointly promote more involvement of Geo-ICT SMEs in EU funded projects: a key to the success of Horizon 2020 is to improve the image of European research projects and to increase awareness among SMEs;

> Future framework programmes for research and innovation (e.g. Horizon 2020) to stimulate fresh and innovative ‘small’ projects: to be really achievable for ‘micro’ and ‘small’ enterprises, SMEs need ‘small’ and smart projects;

> European Commission and Member States to encourage Regions in the use of ICT Innovation Vouchers to support Geo-ICT SMEs;

> European Commission and R&D programmes to require public administrations to make their geodata available as open data when participating in co-funded projects (e.g. Horizon 2020), in order to guarantee ex-ante the re-use of the information collected and/or processed in such projects;

> European Commission to establish a transparent and easy-to-implement licensing framework in order to support the use and creation of added value for digital spatial content: this is one of the valuable initiatives that can contribute to lowering the existing barriers regarding data accessibility by private companies;

> Member States to promote guidelines for public procurement procedures related to INSPIRE: harmonised basic public procurement procedures with minimal requirements and methods are essential (this may fall within the scope of the current EULF Study);

> Public administrations to address the problem of “closed” procurements that prevent Geo-ICT SMEs tendering: this could be assisted by greater use of Open Source Software by public administrations;

> European Commission and Member States to promote the adoption of pre-commercial procurement approaches when activities such as solution exploration and design, prototyping, etc.;

> Standardisation bodies to make more efforts to engage with Geo-ICT SMEs, particularly with regard to INSPIRE standards and specifications.

### > For the smeSpire Network

Geo-ICT SMEs need to build up a critical mass, focused on real needs and requirements: in this direction SMEs need to improve their networking capabilities (social media or individual social behaviour are not sufficient in a global market).

SMEs also need a clearer communication strategy around INSPIRE, and they need to actively participate in INSPIRE debates also to better describe benefits to public authorities at local level.

In line with these requirements the following recommendations are provided for the future of the smeSpire Network:

> The smeSpire Network should act as a mediator and facilitate the connections with other European Commission initiatives like the ISA actions EULF and ARe3NA (see [http://ec.europa.eu/isa/index\\_en.htm](http://ec.europa.eu/isa/index_en.htm));

> The smeSpire Network should also support SMEs to play an active role in the INSPIRE Maintenance and Implementation Framework (MIF);

> The smeSpire Training Platform and the Best Practice Catalogue (available on [www.smespire.eu](http://www.smespire.eu)) should be shaped as a sort of marketplace where different members may offer their own expertise to improve quality and quantity of training modules for “INSPIRE beginners”, provide reference implementation solutions for INSPIRE;

> The smeSpire Network should become a legal entity in order to provide ancillary activities and services to the members, for example to improve knowledge and skills of Geo-ICT companies about project management, resource planning, methodologies and tools.

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