Assessing organisational aspects of Sub-national SDIs:
The case of the Balearic Islands and Catalonia

MSc GIMA thesis
Assessing organisational aspects of Sub-national SDIs: The case of the Balearic Islands and Catalonia

Master Thesis Geographical Information Management and Applications

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Reviewer: Lukasz Grus
Wageningen
Abstract

This research explores from what organisational experiences and developments the Balearic Islands’ Spatial Data Infrastructures could benefit from Catalonia’s SDI. Four case studies are the basis of the research: the SDI of Catalonia (IDEC), the SDI of the Balearic Islands (IDEIB), the SDI of Mallorca (IDEmallorca) and the SDI of Menorca (IDEmenorca). The purpose of this research is because the Balearic Islands’ autonomous region is a sub-national entity in the early phase of building a SDI. The archipelago is taking its first SDI steps and affronting the challenges that this supposes. Considering the IDEC won the eSDI-Net+ 2009 best practice award and because of the cultural and physical closeness the IDEC is considered the best SDI node from which the Balearic Islands SDI nodes could benefit from. However, there is also the danger of just copying the IDEC case. Further, there’s consideration of the uniqueness of each case study. Besides, it’s known the experience of one case leads to dilemmas because the nature of assessing SDIs is non-trivial. Therefore, during the research, there’s been consideration about the non-trivial aspects of the SDI assessment. The three important features considered in the non-trivial issue of SDIs are: ambiguity, multi-faceted nature and non-trivial SDI assessment with the need to cope with risk.

The case study investigation method was performed for three reasons. First, to learn about the organisational status. Second, to answer “how” and “why” questions. And, third, it is an appropriate way to research the sub-national SDIs in the Balearic Islands and Catalonia. The responsibilities of all the case studies are to make the spatial information accessible for all the users. Then, the roles of all the case studies are public information distribution, link from IDEE to their node and participant in the IDEE. Among other organisation aspects the triangular organisational structure and the maturity matrix were investigated and analysed. Through the surveys it was found out there are various similarities and differences between the Balearic Islands’ and the Catalan triangular organisation structure and other organisational aspects. The IDEC, created in 2001, and the IDEIB, that began in 2007, are at the network GII stage and at the “internetwork” stage, respectively. Both have a similar triangular organisation structure based on their responsibilities. Further IDEmallorca, which started in 2008, is at the intermediary GII stage, and IDEmenorca, which also began in 2008, is at the exchange GII stage. Besides, both follow a similar triangular organisation pattern.

After performing a SWOT analysis of the cases studies based on the eSDI-Net+ indicators and the survey answers it is possible to affirm the Balearic Islands SDI nodes have a series of common strengths. These common strengths are: enable value adding services, existing Geoportal and view services, openness with data services (WMS), processes to assess SDI use and user satisfaction, service performance measurements, training provided to staff, legal status of the SDI node organisations and SDI related documentation in Catalan. Then, the weaknesses that all the Balearic Islands SDI nodes need to solve, according to this research, are the lack of strategy and technology and data problems. Also, the IDEmallorca and the IDEmenorca need to solve the following constraints: lack of support of the Councils to the SDI node, inadequate resources and insufficient awareness, poor perception and lack of commitment. To solve these constraints the Balearic Islands SDIs can benefit from the experiences and developments of the IDEC. These experiences and developments are thirteen: learn from other experiences; importance of encouraging local entities; coordination and collaboration between the regional and local entities; sectorial approach; support of the SDI in the organisation; raise awareness on SDI benefits; more partnerships; digital information available; focus on end-users; system engineering point of view; consider project environment; eGovernment funding; total investment paid back in 6 months.
Acknowledgments

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I would like to thank all the case study survey respondents – the head of the IDEC support department, the head of the IDEIB support department, the Territorial Information unit of IDEmallorca and the head of Menorca’s cartography technical group - for their useful answers and their immediate responses. Without their survey answers this thesis wouldn’t have been possible. Specially, I would like to thank the members of the Territorial Information unit of the Consell de Mallorca for guiding me and teaching me so many things during my year there.

Last and not least, I would like to thank my boyfriend Hugues and my mother Dianne my biggest sources of support. I want to thank them for their patience and for always being there. Without their encouragements GIMA and writing this thesis would have been much harder.

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<td>ACTIG</td>
<td>Associació Catalana de Tecnologies de la Informació Geospacial</td>
<td>Catalan Association of Technology Geospatial Information</td>
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<td>AESIG</td>
<td>Asociación Española de Sistemas de Información Geográfica</td>
<td>Spanish association of Geographic Information Systems</td>
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<td>ANZLIC</td>
<td>El Consejo de Información Espacial de Australia y Nueva Zelanda (antes conocido como el Consejo de Información Territorial de Australia y Nueva Zelanda)</td>
<td>The Spatial Information Council of Australia and New Zealand (formerly known as the Australia New Zealand Land Information Council)</td>
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<td>AOC</td>
<td>Consorci d’ Administració Oberta de Catalunya)</td>
<td>Consortium for Open Administration of Catalonia</td>
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<td>CCC</td>
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<td>Cartographic Coordination Commission</td>
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<td>CIME</td>
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<td>Centro de Información y Red de Creación de Empresas</td>
<td>Network Information Centre and Business Creation</td>
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<td>CNIG</td>
<td>Centro Nacional de Información Geográfica</td>
<td>National Geographic Information Centre</td>
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<td>CREAF</td>
<td>Centre de Recerca Ecològica i Aplicacions Forestals</td>
<td>Centre for Ecological Research and Forestry Applications</td>
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<td>CSDI</td>
<td>Infraestructura de Dades Espacials Catalana</td>
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<td>DERM</td>
<td>Modelo Terrestre de Referencia Digital</td>
<td>Digital Earth Reference Model</td>
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<td>DGTO</td>
<td>Direcció General d’ Ordenació del Territori</td>
<td>Directorate General of land zoning</td>
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<td>Departament d’Universitats, Recerca i Societat de la Informació</td>
<td>Department of Universities, Research and Information Society</td>
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<td>eGovernment</td>
<td>Govern electrònic</td>
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<td>Red Europea de Infraestructuras de Datos Espaciales</td>
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<td>IBESTAT</td>
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<td>ICC</td>
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<td>IDE</td>
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<td>IDESCAT</td>
<td>Institut d’ Estadística de Catalunya</td>
<td>Statistics Institute of Catalonia</td>
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<td>II</td>
<td>Infraestructura de Información</td>
<td>Information Infrastructure</td>
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<td>Instituto Geográfico Nacional</td>
<td>National Geographic Institute</td>
</tr>
<tr>
<td>JRC</td>
<td>Centro de investigación conjunta</td>
<td>Joint Research Centre</td>
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<td>Localret</td>
<td>Consorci local format per les administracions locals de Catalunya</td>
<td>Consortium of all the local entities of Catalonia</td>
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<td>NUTS</td>
<td>Nomenclature des Units Territoriales Statistiques</td>
<td>Nomenclature des Units Territoriales Statistiques</td>
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<td>Metadata</td>
<td>Metadata</td>
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<td>SDI</td>
<td>Infraestructura de Datos Espaciales</td>
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<td>Sistema d’ Informació d’ Administració Local</td>
<td>Information System of Local Administration</td>
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<td>SIGEM</td>
<td>Sistema Integrado de Gestión Municipal</td>
<td>Municipal Integrated Management System</td>
</tr>
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<td>Local Informatics service of Menorca</td>
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<td>SIT</td>
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<td>Sistema de Información Territorial del Principado de Asturias Infraestructura de Datos Espaciales de Asturias</td>
<td>Territorial Information System of Asturias Spatial Data Infrastructure Asturias</td>
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<td>STSI</td>
<td>Secretaria de Telecomunicacions i Societat de la Informació</td>
<td>Ministry of Telecommunications and Information Society</td>
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<td>SWOT</td>
<td>DAFO (Debilidades, Amenazas, Fortalezas, Oportunidades)</td>
<td>Strengths, Weaknesses, Opportunities, Threats.</td>
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<td>WMS</td>
<td>Web Map Service</td>
<td>Web Map Service</td>
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<td>WFS</td>
<td>Web Feature Service</td>
<td>Web Feature Service</td>
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Part 1

Introduction
1 Introduction

1.1 Research background

Smaller sub-national units divide countries to manage their territory easier. Each sub-national entity has a certain degree of autonomy and manages itself through its own government and institutions. Sub-national entities have diverse administrative competences to manage their territory.

The Balearic Islands’ autonomous region is a sub-national entity in an early phase of building its SDI. The archipelago is taking its first SDI steps and affronting the challenges that this supposes. These challenges are mainly: data sharing agreements between inter and intrajurisdictional institutions and organisations, metadata creation and SDI promotion to technicians and public. The high degree of administrative decentralisation and insularity are other conditioning factors that complicate the SDI implementation.

Existing models and other organisations' experiences are excellent sources for valuable information and potential strategies for an organisation implementing a GIS (Somers, 1994, p.41). Therefore, a solution would be to find a solid SDI from which the islands could get ideas and learn from. Physically and culturally, the most proximate autonomous region is Catalonia. Further, Catalonia’s autonomous region’s SDI received a SDI best practice eSDI-Net+ 2009 award. Also, the SDI of Catalonia was the first fully developed regional SDI in Spain (EC-INSPIRE, 2007, p.16). For this Catalonia has the ideal SDI from which the Balearic Islands could benefit from. And so forth, this thesis research question is: from what organisational experiences and developments could the Balearic Islands’ SDIs benefit from Catalonia’s SDI? This research is important to show the organisational status of the Balearic Islands’ and Catalonia’s SDIs. Besides, the developments of Catalonia’s SDI that can benefit the Islands are investigated. The main challenges identified for this research are two. The first challenge is the little-known and published about the sub-national autonomous region and the local SDI levels. And the second challenge is the non-trivial aspect of assessing SDIs.

The thesis has supposed a personal challenge consisting in investigating and understanding some sub-national SDI organisations. For most GIS students the abilities to understand the roles of GIS in organisations and to be able to help users formulate their requirements will be more valuable than will be an ability to code ever more efficient “C” algorithms (Reeve, 1999, p.10). Further, this thesis topic should be valuable to understand the roles of SDI in Catalonia’s and the Balearic Islands’ organisations. Besides, this understanding serves to find out how the IDEC can inspire the Balearic Islands SDIs.

The research approach consists of a five-phase process that results in the answer of the main question. The five phases are: initiation, design, implementation, evaluation and closeout. The initiation phase consisted of a literature research to choose a topic and deliver the thesis proposal. In the design phase drawing a case study framework, literature reviewing and reporting and creating questions for the interview took place. The evaluation phase compromised analysing and discussing the benefits that Catalonia’s SDI could give to the Balearic Islands SDI development. The closeout phase consisted of the conclusions and recommendations.

1.2 Research questions

The research questions are the main issues to answer, analyse and report during this thesis report. The main research question is:
From what organisational experiences and developments could the Balearic Islands’ SDIs benefit from Catalonia’s SDI?

The following research sub-questions provide answers to reach the main research question. Other questions divide all the sub-questions except the last one.

A. What is Spatial Data Infrastructure?
Defining the SDIs, listing its components and drawing non-trivial SDI aspects, introduces the SDI concept. Further, explaining the SDI hierarchy and sub-national SDI in the SDI hierarchy helps to complete the SDI definition.

B. What are organisational aspects?
Describing the organisation and orgware concepts clarifies the organisational aspects. After that, mentioning the geowares introduces the concept and its relation with the organisations. Following, drawing the structure of organisations fills in valuable information about the organisation’s composition. Then, illustrating the maturity matrix and recognising the stages of institutional developments and the specific characteristics of each stage completes information about SDI development. Further, listing aspects that impact on the organisational development helps find weaknesses and strengths. After that, mentioning the functions of the roles, responsibilities and organisational SDI developments completes the organisational aspects. Finally, introducing the assessment of SDIs together with presenting the eSDI-Net+ indicators and the SWOT analysis covers the evaluation methods of the report.

C. What is the general Spanish NSDI frame of reference?
Illustrating the Spanish “sub-state” structure presents the general Spanish NSDI framework. Then, exploring the Spanish eGovernment strategy introduces one of the governments IT tools. Further, enumerating the SDI initiatives in Spain gives an overview of the different initiatives. Finally, drawing the common ground floor of the IDE gives a general view of the NSDI.

D. What is the status of the organisational context (orgware) of the SDIs in Catalonia and the Balearic Islands?
Drawing the Catalan and Balearic Islands’ institution’s organisational structure informs about the general administrative situation. After, describing the triangular structure of the Catalan and Balearic Islands’ organisations introduces the case studies organisational structures. Outlining aspects of the orgware, humanware and infoware provides in depth information about the organisations of the case studies.

E. What “bottom-up” aspects impact on the Balearic Islands’ SDI developments?
And vice versa, what “top-down” aspects impact on the Balearic Islands’ SDI development?
Portraying the “bottom-up” and “top-down” strengths and weaknesses that impact on the Balearic Islands’ SDI developments provides information about beneficial and detrimental aspects that impact on the case studies.

1.3 Reading guide

This thesis has the following structure.

Part 1 - Introduction
Part 1 consists of chapter 1. This chapter provides an overview of the research problem and the research questions.
Part 2 - Conceptual framework
Chapters 2, 3 and 4 build part 2. These chapters discuss the theoretical background of the case studies. This background presents the SDI concept, in chapter 2. Chapter 3 introduces the organisational aspects. And, chapter 4 summarises the main SDI and organisational issues.

Part 3 - Case study design framework
Chapter 5 outlines the conceptual design, research approach, research assessment framework and stages.

Part 4 - Case studies organisational context
Part 4 presents Spain’s NSDI frame of reference, in chapter 6, and the case studies findings in chapters 7 and 8. Chapter 7 introduces the SDI organisational aspects of the Balearic Islands.’ And chapter 8 displays Catalonia’s SDI organisational context.

Part 5 - Case study evaluation: discussions and results.
Part 5 presents the discussions and results of the research in chapters 9 and 10, respectively. Chapter 9 compares and evaluates the general organisational aspects of the case studies. And, chapter 10 describes the experiences and developments of the Catalan SDI which can benefit the Balearic Islands’ SDI.

Part 6 – Thesis conclusions and recommendations
Part 6 consists of chapter 11. Chapter 11 summarises the research, draws final conclusions and provides future recommendations to benefit the Balearic Islands’ SDI.

Readers that are interested in detailed information on the case studies SDIs are referred to chapters 7, 8 and 9.
Part 2

Conceptual framework
2 Spatial Data Infrastructure

2.1 Introduction

SDI initiatives are non-trivial and they create, maintain and disseminate spatial data. An SDI consists of different components and can be found at different hierarchal levels.

This chapter examines the Spatial Data Infrastructure concept. It seeks to clarify the Spatial Data Infrastructure definition with its non-trivial aspects, its components and hierarchy. Also, it emphasises the sub-national level inside the SDI hierarchy.

2.2 Spatial Data Infrastructure definition

A “Spatial Data Infrastructure” (SDI) is the means to assemble geographic information that describes the arrangement and attributes of features and phenomena on the Earth. The information is data with meaning and context (Hanold, 1972 cited in Heywood, 2006, p.33). The infrastructure includes the materials, technology, and people necessary to acquire process and distribute such information to meet a wide variety of needs (National Research Council, 1993 cited in Crompvoets, 2009, p.1). To better understand the multidimensional nature of SDI, a system of classification is needed to organise the many definitions and various aspects of the nature of SDI (Chan, 2001, p.15). Chan (2001) developed a system to organise the definitions for GIS into the following four different perspectives:

- Identificational perspective. Description of the unique features of GIS distinguishing it from other information systems.
- Technological perspective. Description of a GIS as a form of technology providing specific functional capabilities.
- Organisational perspective. Description of a GIS in terms of building blocks, which include the organisational and/or institutional implementation environment
- Productional perspective. Presentation of GIS as the means in the production process of the organisation generating products and services expected by its clients.

The objectives of SDI initiatives are to create, maintain and disseminate spatial data for the benefit of society (McDougall, 2009, p.214). SDI’s are the basic underlying frameworks in order to use spatial data in an efficient and effective way. Further, the Spatial Data Infrastructure is built up; involving the creation of guidelines, standards and procedures within a framework that is supported by a scientifically-based and technically competent distributed group of data custodians and related agencies (ANZLIC, 2007, p.iv).

2.3 Non-trivial aspects of SDIs and SDI assessment

SDIs are non-trivial for many reasons. First, the SDI concept is ambiguous, and its understanding needs cross-disciplinary research. Second, SDIs are multi-faceted and have a reciprocal (dual) relationship with their (societal) context. Finally, assessment itself, including that of SDIs, is non-trivial as the general evaluation and assessment discourse clearly demonstrates that the development of concrete SDI initiatives has to cope with risk (Crompvoets, 2008, p.23).

The assessment of SDIs is about a ‘moving target’ in that it is multi-faceted – different things at the same time, dynamic and transformational, and constituted in a never finished social process of negotiation (Crompvoets, 2008, p.37). Dilemmas indicate and reflect value conflicts that are inherent in the design and implementation of SDI initiatives and bring with them the need for multi-faceted, if not multi-method, assessment. Therefore, design and implementation under uncertainty requires both flexibility and adaptation to changing
circumstances along with robustness so as to not break down. Developing viable SDIs is therefore a form of risk management to find a safe middle ground between various threads (Crompvoets, 2008, 34).

2.4 SDI components

Spatial Data Infrastructures are made up by a sum of components. Different authors have different views and opinions about the SDI components. There’s a brief introduction to Williamson’s and van Loenens models in the following lines.

It is generally agreed that SDIs comprise people, access issues, policies, standards and data issues with all presenting major challenges if SDIs are to mature and deliver the spatial information vision (Williamson, 2004, p.1). People and data are the central elements of Williamson’s nature and relations between SDI components model (figure 1). The five components of SDIs described by Williamson (2004) are: people, access, policy, standards and data.

Datasets are the centre of van Loenen’s (2006) model and institutional framework, financial resources, policies, technology, standards and human resources surround them. In relation to Williamson’s model the new elements described by Van Loenen (2006) are: institutional frameworks and financial resources (figure 2).

2.5 SDI hierarchy

Infrastructures operate in hierarchical layers. The highest layer applies to the global community, the lower only to local communities (Van Loenen, 2006, p.30).
Rajabifard et al. (2000a) argues that by viewing SDIs as a hierarchical system it is possible to gain a better understanding of the political and administrative issues that impact on SDIs (McDougall, 2002, p.3). The dynamic nature of the SDI hierarchy can be seen in figure 3 (GII hierarchy), where there are vertical and horizontal relationships. In this figure the higher levels build on the lower levels of GII and can be visualized within a pyramid structure (Van Loenen 2006, p.32).

Each SDI at the local level or above is primarily formed by the integration of spatial datasets originally developed for use in corporations operating at that level and below (Rajabifard, 2001, p.5).

There are two visions in the SDI hierarchies: top-down and bottom-up. While the top-down vision emphasises the need for standardisation and uniformity the bottom-up vision stresses the importance of diversity and heterogeneity given the very different aspirations of the various stakeholders and the resources that are at their disposal (Masser, 2005b, p.11).

Table 1 demonstrates the potential direct and indirect impacts and relationships of any level of SDI on the other levels through each of the components. This represents general patterns of relations between levels of SDIs (Rajabifard, 2000, p.7). According to table 1 the potential direct impacts and relationships of the local SDI is on the state SDI. On the other hand, the state SDI only has direct impact on the local and national SDIs. Each level of SDI only has direct impact on the level before and above.

![Figure 3: GII hierarchy (Williamson et al., 2003)](image)

<table>
<thead>
<tr>
<th>Policy</th>
<th>Local SDI</th>
<th>State SDI</th>
<th>National SDI</th>
<th>Regional SDI</th>
<th>Global SDI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>L=L; S=S</td>
<td>S=S; L=L</td>
<td>N=N; E=E</td>
<td>R=R; L=L</td>
<td>G=G; L=L</td>
</tr>
<tr>
<td>Fundamental Datasets</td>
<td>L=L; N=N</td>
<td>S=S; L=L</td>
<td>N=N; E=E</td>
<td>R=R; L=L</td>
<td>G=G; L=L</td>
</tr>
<tr>
<td>Technical Standards</td>
<td>L=L; R=R</td>
<td>S=S; L=L</td>
<td>N=N; E=E</td>
<td>R=R; L=L</td>
<td>G=G; L=L</td>
</tr>
<tr>
<td>Access Network</td>
<td>L=L; G=G</td>
<td>S=S; L=L</td>
<td>N=N; E=E</td>
<td>R=R; L=L</td>
<td>G=G; L=L</td>
</tr>
<tr>
<td>People</td>
<td>L=L; S=S</td>
<td>S=S; L=L</td>
<td>N=N; E=E</td>
<td>R=R; L=L</td>
<td>G=G; L=L</td>
</tr>
</tbody>
</table>

![Table 1: Relations between different levels of SDIs (Rajabifard, 2000)](image)
2.6 Sub-national SDI in the SDI hierarchy

There is little known and published about sub-national autonomous region and local SDI levels. Sub-national entity is a common term for an administrative region within a country or political division on an arbitrary level below that of the state typically encompassing municipalities, counties provinces or autonomous regions with a certain degree of autonomy.

The sub-national government level of a SDI hierarchy is similar to the operational tier of an organisational structure (figure 4). These levels produce, collect and manage large scale data which contributes to higher levels of the SDI hierarchy (Rajabifard, 2006, p.4). Also, Rajabifard (2007) stated that, although national SDI developments are fundamental to building the SDI culture and policy, it is sub-national and local SDI development that will deliver the immediate benefits to citizens and the community (McDougall, 2007, p.505).

The user technical requirements that the sub-national SDIs are expected to fulfil relate to improving the accessibility to data that meet quality and quantity criteria (Salgé, 2009, p.8). Therefore, evidently successful SDI implementation will be heavily dependent on the extent of the sub-national agencies involvement.

Provincial organisations follow general policies of the related national organisation. Some of the local services or executive activities may be conducted / carried out by local organisations under supervision of provincial organisations (Mansourian, 2008, p.599). The local SDI is closest to the public and is the level with more spatial data detail. They generally promote the interests of their local communities, including the social, economic, environmental, recreational, cultural, and/or general development of the region (O’Flaherty, 2005, p.736).
3 Organisational aspects

3.1 Introduction

An organisation is a process to reach a specific objective through people who make up and administer something.

This chapter addresses theory and concepts of the organisations’ structures and developments. To begin with the organisation concept is defined. Second, the geowares are identified. Third, the triangular structure of organisations is drawn. Fourth, the maturity matrix with its stages of GII development is presented followed by the organisational aspects at a determined stage. Fifth, the aspects that impact on the organisational SDI development are explained. Sixth, the roles and responsibilities approach is introduced. And, finally the assessment of a SDI from a organisation perspective exhibits the eSDI-Net+ indicators and the SWOT analysis.

3.2 Organisation concept

Recognising that organisational issues can be critical factors in determining the success of Information Systems, has meant that information Scientists have had too much richer conception of what “organisations” are, how they behave, and how they are likely to respond to the introduction of new information technologies (Reeve, 1999, p.7). There are many definitions for organisations. Two definitions of organisations with slightly different finalities have been chosen:

- “A structured process in which individuals interact for objectives” (Hicks, 1976 p.23)
- “The persons (or committees or departments etc.) who make up a governing body and who administer something” (website Webster).

The combination of both definitions gives the following one: an organisation is a process to reach a specific objective through people who make up and administer something.

Morgan (2006) distinguishes eight metaphors for organisations: machine, organism, brain, culture, political system, psychic prison, flux and transformation, and instrument of domination. Each metaphor highlights other aspects of organisational life. For further analysis, the metaphors can be grouped into three groups: the machine group, the organism group, and the mind group (Gazendam, 1993, p.1). No one metaphor can give a total view of the system; therefore, Morgan recommends using a dominant metaphor and other supporting metaphors to give a more accurate depiction of the organisation (Morgan, 2006, p. 156).

The components of an organisation structure mentioned in Baligh (2006) given in Baligh and Damon (1980) are a set of: people, variables, things used as a reward, assignments and decision rules.

Within the organisation structure also, organisations can be regarded as people management systems. They range from simple hierarchies along traditional lines to complex networks dependent on computer systems and telecommunications (Price, 2007, p.161). Further, the interrelated conditions in which an organisation exists or occurs influence greatly its characteristics. In other words an organisation’s context, environment or settings determines the “personality” of the organisation. Nedovic-Budic (1996) highlighted two contexts for organisations: the internal and external ones (Nedovic-Budic, 1996, p.556).
Referring to an ideal organisation, the question to ask is: What makes an organisation effective? According to Grantmakers for Effective Organisations, it is “the ability of an organisation to fulfil its mission through a blend of sound management, strong governance, and a persistent rededication to achieving results” (Connolly, 2001, p.2).

3.3 “Geowares”

The “geowares” approach describes an organisation by the means of (GI) resources. These resources or geowares are: orgware, humanware, infoware and technoware. Orgware, humanware and infoware are the three geowares briefly analysed in this report. Technoware is out of the scope for this research.

Orgware

The arrangements and linkages required to facilitate the effective integration of technoware, humanware and infoware may be referred to as ‘orgware’. Orgware comprises allocations, systematisations, organisation, network communication, grouping and all other aspects of management practice (Cohen, 2004, p.91). In this sense, the orgware concept refers to plans, preparations, agreements and negotiations arranged around the infoware, technoware and humanware issues.

Humanware

Humanware are the people responsible for designing, implementing and using GIS. Without properly trained personnel with the vision and commitment to a project little will be achieved. The significance of the people involved in GIS is, regrettably, all too often overlooked by those with a more technological focus (Maguire, 1991, p.16).

It is well known that, a good team can deliver a successful project even if the technology is deficient (Coote, 1997 cited in Reeve, 1999, p.174). Any organisation approaching the development of a GIS staff plan should look first at its own functional needs and derive their own position titles and descriptions from those GIS support requirements (Somers, 1994, p.46). Four GIS support requirement positions can be derived (figure 5): GIS Manager for management, System support for system and database support, user support and production.

![Figure 5. GIS staff organisation (Somers, 1994)](image-url)
Infoware

With regards to infoware, Traub (1998) identifies the quality and the quantity of available data as being significant contributors to the success of any GIS.

The arguments for data sharing are many, but a traditional understanding of its usefulness is often based on the fact that sharing allows data, otherwise isolated and underutilized, to be used repeatedly for many purposes, thus increasing their value without increasing their cost (MacKaay 1982 cited in Tulloch, 2007, p.52).

3.4 Triangular structure of organisations

Chandler (1962) argued that structure follows on from strategy (Price, 2007, p.161). Basically, structure describes the division of work, the hierarchy and authority structure, and the formal links that exist between people within the organisation (Hannagan, 2008, p.274).

The triangle diagram presents ‘another way of considering the benefits which can accrue from investing in Information Systems that is to identify the roles which they fulfil, and the levels at which they are used, within and between organisations’ (Huxhold, 1991 cited in Reeve, 1999, p.21). At a most general level, this ‘typical’ organisational structure is usually represented as a triangular structure (Huxhold, 1991 cited in Reeve, 1999, p.21). The triangular structure according to Hannagan (2008) consists of ‘a more traditional chart with senior managers at the top, middle managers below them and operational staff at the bottom’ (figure 6). At the same time the chart is divided into functional groupings with line management and responsibility flowing down the functions (Hannagan, 2008, p.275).

According to Reeve and Petch (1999) the triangular structure of organisations has its roots in describing organisations in the manufacturing industry. But, it is also very applicable for GI organisations as for example map making can be seen as a production process.

![Figure 6: Triangular organisation structure (Reeve, 1999)](image)

Executive level

The executive committee provides policy guidance and support to the GIS effort. Typically, this committee consists of the heads of the major departments involved in the GIS (Somers, 1994, p.44).
Management level

The functions of the middle layer include analysing information coming from the internal and external sources, comparing performance against targets set by the executive layer and taking any necessary corrective actions (Reeve, 1999, p.23).

The Technical Committee provides the driving force for the actual design and development of the GIS (Somers, 1994, p.44). The mid-manager members would be the ones in this level, also present at the operational level.

Operational level

The data manipulated at the operational level tends to be voluminous, rapidly changing, but of low variety. For instance, information processing in GIS requires the ability to handle large volume of spatial and attribute data but usually only require limited spatial analysis capabilities (Reeve, 1999, p.22).

The operational level is formed in determined cases of the technical committee and/or users (Somers, 1994, p.44).

3.5 Maturity Matrix

This maturity matrix definition belongs under subchapter 3.8 but it is located under subchapter 3.5 to introduce the stages of GII developments and the organisational aspects at a specific stage earlier to the reader.

A possible description of a maturity matrix is an assessment of the level of coherence of the geo-information community. The more coherent the community is, the more likely it will be that the SDI development is successful (Kok, 2005, p.709). The maturity of SDI from an organisational perspective (table 2) is based on the organisational aspects at a specific stage (subchapter 3.5.1) and on Kok’s and Van Loenen’s stages of GII development (sub-chapter 3.5.2).

<table>
<thead>
<tr>
<th>Aspects</th>
<th>Stage</th>
<th>Exchange/Standarisation</th>
<th>Intermediary</th>
<th>Network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vision</td>
<td>Focus on individual organisation</td>
<td>Developed with all stakeholders</td>
<td>Implementation</td>
<td>Commonly shared, and frequently reviewed</td>
</tr>
<tr>
<td>Leadership</td>
<td>Focus on individual organisation</td>
<td>Questioned</td>
<td>Accepted</td>
<td>Respected by all stakeholders</td>
</tr>
<tr>
<td>Communication</td>
<td>Focus on individual organisation</td>
<td>Open between public parties</td>
<td>Open between all stakeholders</td>
<td>Open and interactive between all stakeholders</td>
</tr>
<tr>
<td>Self-organising ability</td>
<td>Passive problem recognition</td>
<td>Neutral problem recognition</td>
<td>Actively helping to solve identified problems</td>
<td>Actively working on innovation</td>
</tr>
</tbody>
</table>

Table 2: Maturity of SDI from an organisational perspective (Kok, 2005)

3.5.1 Stages of institutional development

An SDI develops gradually. Step by step the needed components are improved and the
most pressing issues addressed (Kok, 2005, p.700). Each stage of evolution breeds its own revolution, and how management solutions to each revolution determine the next state of evolution (Greiner, 1994, p.4).

Nolan was the first author to introduce a growth model. Nolan’s (1979) stage of growth model is concerned with the general approach to IS/IT in an organisation. Other stages of growth models are concerned with specific perspectives or applications of IS/IT. One example is Earl’s (2000) stages of growth model for e-business (Gottschalk, 2002, p.84). Another example is Kok’s and Van Loenen’s (2005) stages of GII development (figure 7). This last grow model aims to explain how the GII may evolve from several ‘stand-alone’ organisations into an institutionalised network of collaborating organisations (Van Loenen, 2006). Kok and Van Loenen (2005) stated “we used Boonstra’s theory as a starting point for a new model assessing the success of a NSDI. This resulted in four stages of development of a NSDI: stand alone, exchange, intermediary, and the network stage. Each of them relate to a specific organisational environment”.

![Figure 7: Stages of GII development (Van Loenen, 2006)](image)

**Stage I: Stand-alone**

The first stage is named stand-alone because of the different organisations that build their own organisational infrastructure (Van Loenen, 2006, p.45). The culture within organisations is conservative, pursuing their own interests, and the willingness to change is lacking (Kok, 2005, p.702). The stand-alone stage has the characteristics of Boonstra’s “cynical context”. In a cynical organisational context the individual organisations potentially participating in the SDI experience no bottlenecks. Change is considered unnecessary and almost no support will exist for change (Kok, 2005, p.702).

**Stage II: Exchange and standardisation on technical level**

In this stage a sense of communality is developed which may result in common short-term goals and recognition of common bottlenecks. The primary focus of the discussions is on standardisation and framework datasets (Kok, 2005, p. 703).

In the exchange stage, two factors may drive the change of organisations: the increased pressures for organisations to operate efficiently and new technology (Van Loenen, 2006, p. 47). As a result, ‘outsourcing’ and cooperation become important.

If the organisation is aware of the need to change and alternative strategies lacking, change is likely to find little resistance (Boonstra, 2000).
**Stage III: Intermediary**

The intermediary stage is the stage between the stages of problem identification and the envisioned situation (Van Loenen, 2006, p. 49). The change in this stage is not promoted from the top, but is initiated at the bottom (Kok, 2005, p.703).

The intermediary context has the characteristics of Boontra’s “desiring context”. In the desiring context many bottlenecks exist in the organisation: the organisation desires a new and better situation. The need for change is evident, but has to be communicated effectively, for example through best practice examples (Kok, 2005, p.703).

**Stage IV: Network**

In the network stage or Boonstra’s “innovative context” few organisational bottlenecks exist and the change process is driven by innovative motives (Kok, 2005, p.703). In the network stage, the GII has become a network organisation with equal players, a clear vision which operate pro-actively (Van Kerkhoff et al., 1999 cited in Van Loenen, 2006, p.51).

**3.5.2 Orgware characteristics at a specific stage of institutional development**

In order to move from one stage to another one has to identify organisational characteristics to come to a more advanced SDI. The likeliness that an ideal situation will be reached depends on four critical organisational components of the SDI: leadership, a vision, communication channels, ability of the spatial information community for self-organisation (Kok, 2005, p.704).

**Leadership**

Leadership is required to ensure that activities in the development of a data infrastructure that meets all local government requirements remain coordinated and focused (ANZLIC, 2007 p.9). Further, continuous support for a SDI both in politics and management would be the thing to strive for (Kok, 2005, p.704).

In the stand-alone stage leadership is lacking. After that, in the exchange stage the awareness of the importance of coordination is increasing and potential leaders are discussed. This process would result in the accepted leadership of one or a limited number of entities (Van Loenen, 2006, p. 53).

**A Vision**

The vision provides the direction for SDI development. A vision shared by stakeholders is likely to direct the activities of the stakeholders in the same direction (Kok, 2005, p.704). A clear understanding of an organisations identity helps the right direction of a vision.

In the stand-alone stage of development, every individual SDI stakeholder may have a unique vision. Later this becomes part of a negotiated vision shared by all (exchange stage). Ultimately an independent vision should be created and supported by all, and often reviewed (network stage).
Communication channels

Communication is important for the acceptance, perception, and support of a leader. Users must develop one-on-one agreement with each and every other user within the region for sharing regional data. If there are n users a complete communication network requires n (n-1) communication channels (Rajabifard, 1999, p.5).

Communication in the first stages of a SDI limits to and is directed to every individual organisation itself. Ultimately, open communication channels should be strived for, enabling everyone to express their thoughts, opinions, and to actively participate in the decision making process (Van Loenen, 2006, p. 54).

Ability to self organisation

Self-organisation is basically the spontaneous creation of a globally coherent pattern out of the local interactions between initially independent components. This collective order is organised in function of its own maintenance, and thus tends to resist perturbations (Heylighen, 2001, p.22).

In the first stages the community will identify problems and leave it to others (the political “leaders”) to solve them. Finally, the community will provide innovative solutions without thinking in terms of problems and solutions, but offering actively better and new user-friendly services (Van Loenen, 2006, p. 55).

3.6 Aspects that impact on the organisational SDI development

This subchapter describes various “top-bottom” and “bottom-up” aspects that affect the SDI development. To start, this subchapter explores issues related to INSPIRE and eGovernment. These INSPIRE and eGovernment issues are compared with “top-bottom” aspects that deal with standardisation. Finally, this subchapter enumerates “sub-state” development constraints. These aspects correspond to “bottom-up” aspects that deal with heterogeneity.

INSPIRE

The Directive 2007/2/EC of the Council and the European Parliament is established as the legal framework for setting up and operating an Infrastructure for Spatial Information in Europe (INSPIRE) based on SDIs established and operated by member states. The legal framework of INSPIRE has two main levels. At the first, there is the INSPIRE Directive itself, which sets the objectives to be achieved and asks the Member States to pass their own national legislation establishing their SDIs. At the second, INSPIRE envisages technical implementing rules in the form of regulations for metadata, harmonisation of spatial data and services, network services, data and service sharing policies (Craglia, 2010).

The main objectives of this European SDI is to support the formulation, implementation, monitoring, and evaluation of Community environmental policies, and to overcome major barriers still affecting the availability and accessibility of spatial data (Crompvoets, 2009, p.4).

Spain has its own national SDI legislation in order to adhere to INSPIRE. Further, Spain adopts common Implementing Rules (IR) in a number of specific areas (Metadata, Data Specifications, Network Services, Data and Service Sharing and Monitoring and Reporting) (inspire.jrc.ec.europa.eu).
**eGovernment**

eGovernance is the public sector’s use of information and communication technologies with the aim of improving information and service delivery, encouraging citizen participation in the decision-making process and making government more accountable, transparent and effective (portal.unesco.org). The goals of eGovernance are the following ones:

- Improve the internal organisational processes of governments;
- Provide better information and service delivery;
- Increase government transparency in order to reduce corruption;
- Reinforce political credibility and accountability;
- Promote democratic practices through public participation and consultation (portal.unesco.org).

More detailed information on eGovernment in Spain is provided in subchapter 6.6.

**“Sub-state” development constraints**

Various authors (Gilfoyle 2004; Coll 2007; Sieber 2000) state that there exist many reasons why SDI might fail.

Over the last 10 years, a number of surveys and research projects have explored the constraints that have limited the potential development of GIS in local government and examined why GIS diffusion has not been as great as first anticipated (Gilfoyle, 2004, p.38). Gilfoyle (2004) stated “these results have been combined with our practical experiences of GIM in a range of local authorities to produce the following list of constraints”. Gilfoyle’s (2004) five general constraints, in table 3, are: inadequate resources, insufficient awareness, poor perception and lack of commitment, lack of strategy, inadequate IT and GIS skills and support and technology and data problems.

<table>
<thead>
<tr>
<th>Inadequate resources</th>
<th>Insufficient staff numbers to implement and operate GIS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inadequate financial resources resulting from both capital and revenues constraints, specially in smaller authorities</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Insufficient awareness, poor perception and lack of commitment</th>
<th>Lack of top-level commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>General lack of IT awareness and of GIS potential in particular</td>
</tr>
<tr>
<td></td>
<td>A bad experience from an earlier involvement</td>
</tr>
<tr>
<td></td>
<td>Failure to capture the imagination of politicians or lack of credibility of early GIS decision support systems or both</td>
</tr>
<tr>
<td></td>
<td>Sceptical or conservative perceptions of other stakeholders such as senior managers, staff, and citizens</td>
</tr>
<tr>
<td></td>
<td>Organisation instability resulting from changes in political control, local government reorganisation, or both</td>
</tr>
</tbody>
</table>
| Lack of strategy                                      | • No information strategy, leading to lack of vision, imagination and innovation  
|                                                    | • Lack of a business case  
|                                                    | • Neglect of human affairs-too technical emphasis  
|                                                    | • Lack of IT strategy resulting in an inadequate technical context within which GIS can be implemented and operated  
|                                                    | • No clear plan for implementing GIS  
|                                                    | • GIS not integrated into the decision-making culture  
| Inadequate IT and GIS skills and support           | • Responsibilities for IT and GIS support unclear  
|                                                    | • Lack of IT and GIS skills  
|                                                    | • Champions and pioneers moving on to another organisation  
|                                                    | • Enthusiasts providing answers to questions nobody may ask  
|                                                    | • Departmental barriers to effective communication  
|                                                    | • Personal decisions of staff that delay, and frustrate rather than help insufficient or inadequate user training  
|                                                    | • Insufficient or inadequate user training  
| Technology and data problems                       | • Inadequate hardware  
|                                                    | • Key systems do not meet requirements  
|                                                    | • No standards for data  
|                                                    | • Digital data, although available, are not affordable  
|                                                    | • Not perceiving data as corporate resources  

Table 3: Constraints limiting GIS developments (Gilfoyle, 2004)

### 3.7 Roles and responsibilities

The high level architectural pattern for the Spanish SDI proposed by Béjar (2004) tries to clarify the position of every participant in a SDI project, in terms of their responsibilities, and roles.

Béjar argues that “on one hand, knowing the responsibilities allow us to discover and fix the “obligations” of every participant, this is, suggesting everyone the minimum set of things they should do to participate in the SDI. On the other hand roles allow us to find and fill gaps, i.e. if the role of providing topographic maps of a region is not played by this region SDI, other SDI (maybe the NSDI) can assume it temporarily” (Béjar, 2004, p.4).

### 3.8 Assessment of SDIs from an organisational perspective

There are many ways of assessing a SDI (see Crompvoets et al. 2008). The assessment of SDIs can help to better understand the issues, to find best practice for certain tasks and to
improve the system as a whole (Crompvoets, 2008, p.1). Some assessment models are: SDI Readiness; clearinghouse suitability; INSPIRE State of Play; organisational; evaluation areas for SDI; performance based management; metaphor organisation; legal and effectiveness from a user’s perspective. Each approach treats SDI from a different view and with a different objective in mind (Crompvoets, 2008, p.4). Also the eSDI-Net+ best practice is an assessment means and the SWOT analysis is a tool for auditing an organisation and its environment. Finally, the level of coherence of the geo-information community is assessed with the maturity matrix (see subchapter 3.5).

3.8.1 eSDI-Net+ best practice assessment framework

In the context of eSDI-Net+, sub-national means NUTS 1, NUTS 2, NUTS 3 levels or any of their aggregations according to the administrative structure of the countries, referring to the nomenclature defined by the European statistical office EUROSTAT (Salgé, 2009, p.4).

At the sub-national level arise SDIs workshops, the central focus of attention in the current eSDI-Net+ project that is funded by the European Commission. The State of Play studies provide a useful overview of developments at the national level, but some of the examples of best practice are to be found at the sub-national level (Craglia, 2009, p.22).

For the assessment of the best practice SDIs, the eSDI-Net+ consortium and the Jury gather information regarding five main criteria. In the framework of these five major criteria groups (table 4), indicators (see appendix II) have been defined to obtain detailed information about the SDIs.

<table>
<thead>
<tr>
<th>Five main criteria</th>
<th>32 weighted indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDI “size” (quantity)</td>
<td>6</td>
</tr>
<tr>
<td>SDI &quot;quality&quot; (meeting user requirements)</td>
<td>7</td>
</tr>
<tr>
<td>Co-operation and subsidiarity</td>
<td>7</td>
</tr>
<tr>
<td>Sustainability</td>
<td>4</td>
</tr>
<tr>
<td>Users usability</td>
<td>8</td>
</tr>
</tbody>
</table>

Table 4: Evaluation criteria and indicators (esdinet.plus.es)

3.8.2 SWOT analysis

SWOT analysis (figure 8) is a tool for auditing an organisation and its environment.

The SWOT analysis assesses an organisations strengths (what an organisation can do) and weaknesses (what an organisation cannot do) in addition to opportunities (potential favourable conditions for an organisation) and threats (potential unfavourable conditions for an organisation) (oie.eku.edu). A SWOT analysis is a four-part approach to analysing a company’s overall strategy or the strategy of its business units. The goal is to identify all the major factors affecting competitiveness.
before crafting a business strategy. The role of SWOT analysis is to take the information from the environmental analysis and separate it into internal issues (strengths and weaknesses) and external issues (opportunities and threats) (oie.eku.edu). Also, it's a way to analyze a company's or a department's position in the market in relation to its competitors. The goal is to identify all the major factors affecting competitiveness before crafting a business strategy.

Masser (2005) developed an article named “Spatial Data Infrastructures: A SWOTs analysis”. Basically this article is a brief SWOT analysis of the whole SDI field. A summary of the findings presented in his article are in the lines below.

**Strengths**
The most important strength of the SDI concept is the way in which it enables a diverse group of users to access a wide range of spatially referenced data sets. The second main strength is the degree to which the SDI concept straddles existing professional and administrative sectorial boundaries. It is inherently an integrating concept that facilitates the use of local, national and global geographic information assets many times in many different applications. The third main strength of the SDI concept is the way it has exploited recent developments in location based services and the Internet and the World Wide Web.

**Weaknesses**
Each of the strengths referred to above also brings with it its weaknesses. The development and implementation of SDIs must reflect the needs of a great diversity of users from all levels of government as well as the private and nongovernmental sectors (Rajabifard et al 2006). Because of the number of stakeholders involved it will also be necessary to devise new kinds of management structures for this purpose.

It must also be recognised that SDIs can only facilitate access to a wide range of users if changes also take place in existing organisational cultures. To be effective SDIs require data sharing on an unprecedented scale. Similarly, the extent to which SDIs straddle professional and administrative sectorial boundaries may lead to problems in building up and maintaining a consensus among the stakeholders involved over time.

**Opportunities**
The most important opportunity is the growing public awareness of the potential for SDI development in an Information Society. Another important opportunity for SDIs arises from the growing pressure to make public sector information more readily available for reuse by the private sector. Attention should also be drawn to the opportunities that are being created by the development of new kinds of internet mapping products such as Google Earth (www.earth.google.com) which are dramatically changing the way that geographic information is made available to users.

**Threats**
As was the case with respect to the strengths and weaknesses the opportunities created by the Information Society and public sector information debates and the development of products such as Google Earth also bring with them threats. There is already some concern that the GI/SDI sector will be swallowed up by developments elsewhere and lose its identity in the process.
4 Summary

SDI initiatives are non-trivial and they serve to create, maintain and disseminate spatial data. A sum of people, access issues, policies, standards, data issues, institutional frameworks and financial resources are the components of a SDI. The sub-national government level of a SDI hierarchy is similar to the operational tier of an organisational structure (Rajabifard, 2006, p.4). Some of the examples of best practice are to be found at the sub-national level (Craglia, 2009, p.22).

An organisation is a process to reach a specific objective through people who make up and administer something. Geographic Information resources are another way of describing organisations by the means of geowares. Besides, Information System's roles and levels can be identified through a triangle organisation structure. The GII evolution from a stand-alone into a network organisation obeys to the stages of GII development. Each of the stages has specific characteristics. Every participant in a SDI project has a position in terms of their responsibilities, and roles. The INSPIRE and the eGovernment have important “top-down” responsibilities. Further, there exist many “bottom-up” constraints which need changes in the roles and responsibilities of their participants. The needed changes and existing constraints can be assessed with a maturity matrix, a SWOT analysis and an eSDI-Net+ indicators assessment. In this way, the level of coherence of the geo-information community is assessed with a maturity matrix. Also, an organisation and its environment can be audited with a SWOT analysis. Besides, the eSDI-Net+ assessment analyses information based on five main criteria.
Part 3

Case studies design framework
5 Case studies design framework

5.1 Introduction

Chapter five is a layout of the research design and methods used to answer the research questions and to achieve the research aim. The first part of chapter five explores the conceptual research framework by discussing the research problem and questions. And then it determines the research assessment framework to answer these questions. Further, this chapter provides a justification of the chosen research approach and the final research design. Also, this chapter details the research methods stages and procedures.

5.2 Conceptual design and framework

The organisational and SDI aspects were the main literature research targets. These aspects were necessary to answer the main research question and to find out the status of the organisational aspects of the case studies.

In figure 9 the conceptual design framework illustrates the relationship between the research problem, aim, research questions, methods and evaluation.

![Figure 9: Conceptual design framework](image)

5.3 Selection of research approach and research design

At the initiation phase the dilemma whether to use quantitative or qualitative methods was solved. First of all, a research was designed with both methods. Moreover, case studies were found to be the best method for the research.
Qualitative methods

Qualitative strategies emphasise an interpretive approach that uses data to both pose and re-solve research questions. Researchers develop categories and meanings from the data through an interactive process that starts by developing an initial understanding of the perspectives of those studied (Bredo and Feinberg, 1982a; Van Maanen, 1983b cited in Kaplan, 1988, p.573).

Maxwell (1996 cited in McDougall, 2006 p.95) identified five particular research purposes where qualitative studies are specially suited, including:

1. understanding the meaning, for participants in the study, of the events, situations, and actions;
2. understanding the particular context within which participants act, and the influence that this context has on their actions;
3. identifying unanticipated phenomena and influences;
4. understanding the process by which events and actions take place; and developing casual explanations.

Justification for case study approach

A case study examines a phenomenon in its natural setting, employing multiple methods of data collection to gather information from one or a few entities (people, groups, or organisations). Further, case-study methodology has been recognized by the GIS research community as the appropriate approach for studying issues related to diffusion of GIS technology (Zwart, 1986; Niemann et al.1988; NCGIA, 1989; Craig, 1989; Azad, 1990; Onsrud, Pinyo, and Azad, 1992 cited in Nedovic-Budic, 1996, p.557).

Benbasat (1987) stated that there are three reasons why case study research is a viable information systems research strategy:

1. The researcher can study information systems in a natural setting, learn about the state of the art, and generate theories from practice.
2. The case method allows the researcher to answer "how" and "why" questions, that is, to understand the nature and complexity of the processes taking place.
3. Appropriate way to research an area in which few previous studies have been carried out. With the rapid pace of change in the information systems field, many new topics emerge each year for which valuable insights can be gained through the use of case research.

Reliance on theoretical concepts to guide the design and data collection for case studies remains one of the most important strategies for completing successful case studies (Yin, 2003, p.3).

5.4 Research assessment framework

This subchapter present the theoretical framework used to assess the case studies SDIs. The assessment models and aspects are organised, in this chapter, under the thesis chapters where they are originally presented. These assessment models develop an assessment framework which is the basis for assessing the SDI of the Balearic Islands and Catalonia.
• Chapter 2. Spatial Data Infrastructure

o Subchapter 2.3. Non-trivial aspects of SDI assessment and SDI assessment

From what organisational experiences and developments could the Balearic Islands’ SDIs benefit from Catalonia’s SDI? is a non-trivial research question. Therefore, during all the research, the non-trivial aspects of the SDI assessment have been considered (see chapter 2.3). The three important aspects considered in the non-trivial assessment of SDIs are: ambiguity, multi-faceted nature and non-trivial SDI assessment with the need to cope with risk.

o Subchapter 2.5. SDI hierarchy

➢ Top-down and bottom-up vision

To know the SDI hierarchy vision of the case studies a survey question - 6. What vision within the SDI hierarchy do you prefer for your SDI? – asked about the top-down or bottom-up vision (see appendix V). The vision is important to know if the emphasis of the cases studies is on standardisation and uniformity or diversity and heterogeneity (see subchapter 2.5, 7.3.3, 7.4.3, 7.5.3, 8.5 and 9.1).

➢ Case study level potential direct and indirect impacts on the other levels of SDIs

The basis of the Balearic Islands’ case studies table of relations between different levels of SDIs (see table 17 in subchapter 9.1) is Rajabifard’s (2000) table. Rababifard’s (2006) table is named relations between different levels of SDIs (see table 1 in subchapter 2.5). This table implies the potential direct and indirect impacts of the island council/provincial and autonomous community case study levels on the other levels.

• Chapter 3. Organisational aspects

o Subchapter 3.3. Geowares

➢ SDI node functions

There is a survey question asking which of the five functional areas - management, coordination, system support, database support, user support and production - do the case studies have - 18. Which of the following functions exist in your SDI unit? (see appendix V). These functional areas are derived from Somers (1994) GIS staff organisation (see figure 5 subchapter 3.3).

➢ Most problematic ware

In the survey there was a question about which ware, out of orgware, humanware, infoware or technoware- is more problematic for the SDI node -26. Which of the following components present more obstacles in your SDI? (see appendix V)). Knowing the geoware that presents more problems is a useful indicator to know what the SDI nodes need to work harder on (see subchapters 3.3, 7.3.3, 7.4.3, 7.5.3, 8.5 and 9.1).
Subchapter 3.4. Triangle organisational structure

Each case study has a triangular organisational structure (see subchapters 7.3.2, 7.4.2, 7.5.2, 8.4 and 9.1). The information on the web pages of each of the organisations: ICC, SITIBSA, Consell de Mallorca and Consell de Menorca helped to draw the triangle. The roles which the case studies fulfil, and the three (executive, management and operational) levels of each case study built the triangles.

Subchapter 3.5. Maturity Matrix

A maturity matrix determines the way the orgware characteristics perform at each of the case studies specific stages of institutional development (see subchapters 3.5, 7.3.4, 7.4.4, 7.5.4, 8.7 and 9.1)

- **Stages of Institutional development**

  A question of the survey asked directly about the stage of the GII development of the case studies - 7. *At what stage of development is your SDI?* (See appendix V). This question referred to Kok’s and Van Loenen’s (2005) stages of GII development (see subchapter 3.5). The case studies could choose between four stages of development (see subchapters 7.3.4, 7.4.4, 7.5.4, 8.6 and 9.1). After that, Kok’s and van Loenen’s (2005) orgware characteristics at the specific stage of institutional development serves as another subchapter for each case study (see subchapter 3.5 and 9.1).

Subchapter 3.6. Aspects that impact on the organisational SDI development

- **Constraints limiting GIS developments**

  In the survey there is a question about what constraints limit the GIS development of the case studies - 47. *What aspects of the list have limited the expansion of the SDI initiative?* (see appendix III). The answers could be chosen out of a list of Gilfoyle’s (2004) constraints (see subchapter 3.7, 7.3.3, 7.4.3, 7.5.3, 8.5 and 9.1). Gilfoyle’s (2004) list consisted on 5 main constraints divided in other specific constraints. The general constraints are: inadequate resources, insufficient awareness, poor perception and lack of commitment, lack of strategy, inadequate IT and GIS skills and support and technology and data problems.

Subchapter 3.7. Roles and responsibilities

The information on each case studies’ Geoportal provides the SDI node’s roles and responsibilities. The model from which the roles and responsibilities comes from is Béjar’s (2004) high level architectural pattern for the Spanish SDI architecture (see subchapter 3.7 and subchapters 7.3.1, 7.4.1, 7.5.1, 8.3 and 9.1).

Subchapter 3.8. Assessment of SDIs from an organisational perspective

- **eSDI-Net+ best practice assessment framework**

  The use of the five main indicators of the eSDI-Net+ best practices assessment methodology (see subchapter 3.8 and appendix II) completed the case studies evaluation. The five main eSDI-Net+ criteria were the base of the survey questions (appendix V): SDI “size” (quantity), SDI “quality”
(meeting user requirements), co-operation and subsidiary, sustainability and user usability. Specifically, 30 of the 32 weighted indicators serve as a base for the surveys. However, the numerical calculations of the indicators were out of scope. There were two out of the 32 eSDI-Net+ indicators not investigated because one was not considered relevant for the research and the other indicator was too broad. Those two indicators are the following ones: costs shared among all partners; structured and formalised network of those involved (see appendix II).

- **SWOT analysis**

  A SWOT analysis audits each of the case studies and their environment. The analysis has into consideration the relevant eSDI-Net+ indicators for the research and the literature and survey findings of the case studies (see subchapters 3.8, 7.2.5, 7.3.5, 7.4.5, 8.7, 9.1 and appendix II).

- **Subchapters 8.8 Experiences and developments of the IDEC and 8.9 Benefits of the IDEC**

  - Experiences, developments and benefits of the IDEC

    Four documents, one by Craglia (2008) and the other three by Guimet (2003 and 2004) are the basis of the experiences, developments and benefits of the IDEC of the SDI implementation in subchapters 8.8 and 8.9. Also the general literature and survey results helped out. The selected experiences and benefits of the IDEC were used in chapter 10 to aid the Balearic Islands case study. Further, each experience served to solve constraints limiting the GIS developments of the Balearic Islands.

- **Subchapters 7.3.3 IDEIB organisational aspects, 7.4.3 IDEmallorca organisational aspects, 7.5.3 IDEmenorca organisational aspects and 8.5 IDEC organisational aspects**

  - Case study level of collaboration with different organisations

    Through a survey question each of the case studies rated their levels of collaboration with different organisations - 24. How would you rate the level of collaboration or cooperation of your local/provincial/autonomous community SDI organisation with respect to data or resource sharing with the following organisations? (See appendix V). The organisation administrative levels were: town halls, provincial or island councils, autonomous community organisations, state government departments or agencies, educational institutions and non- government organisations (see subchapters 7.3.3, 7.4.3, 7.5.3, 8.5 and 9.1).

  - Most important benefits of establishing data sharing partnerships

    Two questions of the survey refer to benefits of partnerships and importance of obstacles and barriers to data exchange - 27. Rate the following benefits and/or business drivers for your SDI initiative organisation in establishing data sharing/exchanging spatial data with other agencies: and 46. How do you rate the importance of these obstacles and barriers to data exchange? Mc Dougall’s (2006) report “Local-State Spatial Data Sharing Partnership Model
5.5 Research design

Illustrated in figure 10 is the research design. The overall design consists of five stages which result in the final thesis.

**THESIS RESEARCH APPROACH**
From what experiences and developments could the Balearic Islands’ SDI benefit from the Catalonia’s SDI?

**Phase 1. Initiation**
- Initial literature research
- Establish objectives & research questions

**Phase 2. Design**
- Literature review & report
- Questionnaire design
- Answer research question A to C
- Interview design

**Phase 3. Implementation**
- Ask interview questions
- Answer research questions D
- Maturity matrix and SWOT analysis

**Phase 4. Evaluation**
- Answer: from what organisational experiences & developments could the Balearic Islands’ SDI benefit by Catalonia’s SDI?
- Integration of results: discussions & results
- SDI assessment
- Answer research question E

**Phase 5. Closeout**
- Conclusions and recommendations
- Final thesis

*Figure 10: Thesis research approach*

The following sections of this chapter detail the research methods used throughout this report.
5.6 Research stages and procedures

The research stages and procedures describes the five stages proposed in the research design namely:

- Initiation
- Design
- Implementation
- Evaluation
- Closeout

The research method serves to introduce the research methodology, case study analysis design and the questions for the survey. In the following lines there’s a brief review of each phase.

5.6.1 Initiation

First a literature research helped to choose and gather information for the research topic. Establishing the research questions came subsequently. The thesis proposal worked as the deliverable of the initiation phase.

The case studies investigate from what organisational experiences and developments could the Balearic Islands’ SDIs benefit from Catalonia’s SDI. The choice of the Balearic Islands was as a consequence of the researcher's place of residence, in Mallorca. Mallorca is the biggest island of the archipelago followed by Menorca. Moreover, the Balearic autonomous community encloses both islands plus Ibiza and Formentera. And, Catalonia is physically and culturally the most proximate autonomous community to the Balearic Islands.

5.6.2 Design

A case study framework provided the foundation for developing a suitable conceptual framework for the data collection and assessment. The SDI and organisational theory developed the conceptual framework of the case studies.

Case study data collection

The methods of data collection focused on two primary forms of evidence, surveys and existing documentation. A survey collected data from the relevant employees of the IDEC, the IDEIB, the IDEmallorca and the IDEmenorca. Creating questions for the survey of the Balearic Islands’ and Catalonia's SDIs took place in this design phase. In the Balearic Islands, there is little record of GIS or SDI activities within the autonomous region and local government tiers. Therefore, the use of personal interviews and e-mail or phone communication with relevant GIS and SDI technicians are the only means of understanding the current organisational aspects of the SDI activities in the Islands. In addition, questions for a survey served to understand the current organisational state and development of Catalonia’s SDI.

The surveys had an online format. Some of the reasons for the online option were: homogeneous survey method for all case studies; time saving for surveyed people an almost sure answer; simplest way to answer the questions; straight forward questions and cheaper method. The structure of the surveys broadly covered the following topics: organisation, humanware (people, partnerships) and infoware. The case studies survey summary in
English is in appendix V. And the original surveys in Catalan for each of the case studies are located from appendix VI to appendix IX.

**Interview distribution**

Survey-monkey was the survey program used for the online surveys. The heads of the SDI departments of all the case studies – head of the IDEC support department, head of the IDEIB support department, heads of the Territorial Information Systems unit of the IDEmallorca and the head of the technical cartographic group of IDEmenorca - received an e-mail with the organisational aspect survey link. The limited number of sources for the surveys and the biased problem was known at the time of designing the survey. However, the chosen people for the survey were considered to be knowledgeable of the situation of the SDI. Further, it was the only feasible way of getting the necessary information for this thesis report because of the limited resources about SDI of the Balearic Islands.

**Case study surveys**

The case studies surveys aided to find the missing information of the case studies SDI nodes. The points based on the IDEC chapter of the EC-INPIRE Spanish state of play 2007 served as a model of aspects to find out for the Balearic Islands case studies. Also, thirty of the thirty-two indicators of the eSDI-Net+ five main criteria (table 4) served as a basis to create survey questions. Further, the thesis’ organisational aspects of chapter 3 acted as a basis for other research questions.

The survey has the four following parts: organisation, humanware and infoware.

**Part 1- organisation**

This part of the survey examined the case studies SDI initiative organisation, coordination and legal aspects.

Part 1, served to finish answering subquestion D - *What is the status of the organisational context (orgware) of the SDIs in and between Catalonia and the Balearic Islands?* - . The answers to the subquestion “D” completed unanswered aspects of the status of the organisational context (orgware) of the SDIs in and between Catalonia and the Balearic Islands.

The following survey parts 2, 3 and 4 served to answer the subquestion E- *What points can be outlined of the humanware and infoware in Catalonia and the Balearic Islands?*

**Part 2- Humanware**

The questions were related to people -number of staff, academic qualifications ...- and partnerships.

**Part 3- Infoware**

The infoware questions concerned issues related to data. Some of these issues are language of the data, metadata or organisations providing data.

Finally, there was a question of constraints affecting the development of the SDI initiative. This question can be found at the end of the survey because it’s made up by Gilfoyle’s (2004) GIS constraints (see table 3).
5.6.3 Implementation

The first step was to perform the surveys to understand the complexity of the heterogeneous nature of the Balearic Islands’ and Catalonia’s SDIs. With the survey results answers were obtained for the rest of the research questions. Part 4, of the thesis, consists of the case studies results. In this part, there’s a description of each case study separately, in chapters 7 and 8. The collected literature information and the survey were used to draw each case study.

The answers to subquestion “D” - What is the status of the organisational context (orgware) of the SDIs in Catalonia and the Balearic Islands? – are in chapters 7 and 8, named Catalonia’s SDI organisational context and Balearic Islands’ SDI organisational context, respectively. In the case of the IDEC, also, there’s the description of the experiences and benefits of the IDEC, in subchapters 8.8 and 8.9. Furthermore, the use of the eSDI-Net+ indicators completed the SWOT analysis (see Appendix II). Also, the use of the survey results, information from the Geoportal (infoware-WMS etc) and the literature findings of all the case studies completed the analysis.

5.6.4 Evaluation

After completing each case studies’ general description, came integrating all the outputs to develop a final analysis in order to get results for the report. Part 5 of this research consists of the case study evaluation. Each survey theme has been analysed in subchapter 9 by using tables and figures and by describing similarities and differences between case studies. Further, chapter 10 presents the report results answering the main research question - From what organisational experiences and developments could the Balearic Islands’ SDIs benefit from Catalonia’s SDI? This chapter serves to enumerate and explain the experiences and developments from which the Balearic Islands’ SDI could benefit from Catalonia’s SDI. Further, there is an estimate of the Balearic Islands constraints solved by each of IDEC’s experiences. Finally, there is a summary of IDEC’s experiences that could benefit the Balearic Islands SDI nodes (figure 40) and specific organisational aspects that could benefit the Balearic Islands SDI nodes (figure 41). Two experiences and constraint maturity matrixes were created (appendix III) in order to develop the experiences and specific organisational aspects that could benefit the Balearic Islands’ case studies.

The last subquestion - E. What “bottom-up” aspects impact on the Balearic Islands’ SDI developments? And vice versa, what “top-down” aspects impact on the Balearic Islands’ SDI development? - is also, answered in the evaluation part. This subquestion complements chapter 9. The finality of subquestion “E” is to analyse positive and negative aspects that impact on the Balearic Islands SDI developments. In first place, the answers to the “bottom-up” aspects were provided, mainly, with the strengths and weaknesses of the case studies SWOT analysis of chapters 7 and 8. In second place, the INSPIRE’s and the eGovernment’s strengths and weaknesses provide a brief answers to the “top-down” sub-question.

5.6.5 Closeout

Finally, part 6, of this research belongs to the conclusions and recommendations, in chapter 11. Further, in this phase, the handing in of the final thesis takes place. The final product is a report on the organisational experiences and developments that the Balearic Island’s SDIs could benefit from Catalonia’s SDIs.
Part 4

Case studies organisational context
6 Spanish NSDI frame of reference

6.1 Introduction

This chapter is an introduction of Spain’s general frame of reference. First, there is an introduction of the Spanish SDI. Second, there’s the drawing of the Spanish “sub-state” structure. Third, there is an illustration of the Spanish eGovernmet strategy. Fourth, there’s an enumeration of the SDI initiatives in Spain. Finally, there’s a presentation of the common ground floor for the IDE.

6.2 Spanish SDI

The Spanish National Spatial Data Infrastructure (IDEE for Infraestructura de Datos Espaciales de España), was launched in November 2002, and available in www.idee.es from June 2004. The SDI Initiative IDEE of the “Consejo Superior Geográfico” is directly supported by “Instituto Geográfico Nacional (IGN)” and “Centro Nacional de Información Geográfica (CNIG)”, i.e. the National Centre for Geographic Information (EC-INSPIRE, 2005, p.19). IDEE is joint effort of authorities at the national, regional and local levels. Also a good number of ministries like the agriculture and industry are involved.

6.3 Spanish “sub-state” structure

The decentralized structure of Spanish government in three main levels shows a high level of responsibilities and self-government: the General Government; 17 Autonomous Regions and 2 Autonomous cities (Ceuta and Melilla); and more than 8,100 Municipalities Figure 11 draws the structure of Spanish government. At the top of the structure is the Spanish public administration. And below these is the state’s general administration with four components: central, peripheral, exterior, public organisms, autonomic administration and then the local administration composed of provinces and municipalities.

![Figure 11: Structure of Spanish government based on articles of the Spanish Constitution](image-url)
The Autonomous Community and local levels are the ones directly related to this thesis research. Article 137, of the Spanish constitution (1978) states that “the country is organised territorially into municipalities, provinces and autonomous communities”. All of these entities enjoy autonomy for the administration of their respective interests.

6.3.1 Institutional structure of the Autonomous Communities

The autonomous communities of Spain are the first tier subdivisions of Spain. Fifteen of them are continental, and occupy most of the Iberian Peninsula and two of them are islands. In addition, there are two small Spanish towns in North Africa, the cities of Ceuta and Melilla.

The organisation of the autonomous institution (Article 152-Spanish Constitution, 1978, p.34) is based on a legislative assembly, governing council and a president elected by the assembly (figure 11). The Legislative Assembly is elected by universal suffrage in accordance to a system of proportional representation which shall also assure to represent different areas of the land. The governing council has executive and administrative functions. Finally, the president is elected by the Assembly from among its members and appointed by the King, which has the address of Governing the Council, the supreme representation of the respective communities and the state’s regular former. The President and Council members shall be politically accountable to the Assembly.

The autonomous communities' have wide legislative and executive autonomy, with their own parliaments and regional governments. The distribution of competences is different for every community, collected in the “estatuto de autonomía”. There is a de facto distinction between “historic” communities (Basque Country, Catalonia, Galicia, and Andalusia) and the rest. The historic ones initially received more functions, including the ability of the regional presidents to choose the timing of the regional elections. The Constitution recognises the historical rights of regions in general terms. This is a reference to the special status of certain regions with respect to the whole as a result of past agreements between the central government and the region, sometimes centuries ago. Those rights need actualization through the “estatuto de autonomía”. The initial intent was not that every part of Spain should become part of an autonomous community, but only the creation of “historic” communities. However, shortly after the approval of the constitution, a wave of creation of autonomous communities ensued. The name café para todos (“coffee for everybody”) defined this process by critics of the decentralisation (economicexpert.com).

6.3.2 Institutional structure of the local administration: municipalities and provinces

Within the public organisations that set up the structure of the state, the local entities constitute the lower territorial step, below the state administration and the autonomous communities. The local government entities’ existence is mandatory under the Constitution. The basic local government entities are: municipalities and the province.

Municipal government and administration corresponds to the municipalities respective Town Councils, consisting of Mayors and Councillors (Article 140-Spanish Constitution, 1978, p.28). A city council is the legislative body of a city (website Webster). The action of legislating is the exercise of the power and function of making rules (as laws) promulgated by an official organ of a state or other organisations (website Webster). Further, a mayor is an official elected or appointed to act as chief executive or nominal head of a city, town, or borough (website Webster). Finally, a councillor is a member of a council (website Webster).

The province is a local entity with legal personality, determined by the grouping of municipalities and territorial division for the performance of the state’s activities. The
government and autonomous administration of the provinces shall be entrusted to Provincial corporations or other representative bodies (Article 141-Spanish Constitution, 1978, p.28).

6.4 Spanish eGovernment strategy

According to the epractice.eu webpage the Spanish eGovernment strategy aims to improve the quality of services provided by Central Government while bringing the public administration closer to citizens and businesses. The use of new technologies reducing bureaucracy, simplifying procedures and eliminating unjustified delays is the principal focus. The current Spanish eGovernment strategy results from two policy documents. The first document is the 'Avanza' Plan. This plan is for the development of the Information Society launched in 2005 - in January 2009. Then, the plan entered its second phase, 'Avanza2', which will run from 2009 to 2012 and the Action Plan for the Implementation of the so-called 'Law on eGovernment'. The other policy document is 'Ingenio 2010'. 'Ingenio 2010' is aimed at giving new impetus to R&D investment in Spain within the framework of the National Reforms Programme designed by the Government to comply with the EU's i2010 initiative. Also, the 'Avanza' Plan opts for a user-centric eGovernment which overcomes the most serious challenges facing public eServices.

Avanza Local, the "municipal arm" of the 'Avanza' Plan, intendeds to promote eGovernment at local level areas. The promotion consists of the following issues: diffusion and implementation of the dedicated 'Avanza Local Solutions Platform'; development and implementation of technical solutions of particular use to local government; and the release of studies leading to a good practice catalogue for the content and use of municipal applications (epractice.eu).

6.5 SDI-initiatives in Spain

The IDEE integrates under its umbrella regional projects that can be found in 15 of the 17 autonomous regions and 2 autonomous cities (Ceuta and Melilla). Also, 17 local initiatives have been started in 10 autonomous regions (figure 12). These Spanish SDI initiatives are briefly described below:

- IDEAndalucia: The SDI of Andalusia geoportal, operated by the Andalusian Cartographic System, provides online access to users wishing to search, locate, view, download or request geographic data pertaining to the territory of Andalusia (ideandalusia.es).

  The local initiatives are IDEMap, the SDI from Malaga, and the SDI of the Doñana Natural Park.

- SITAR: The Aragón Territorial Information System is a platform of information of the Aragón’s Autonomous Region territory. Its main aim is to provide geographical information which allows the different managers and users to do their work in the most suitable way. So, it’s conceived as a repository of the territorial information of the Aragón Government and as a viewer with GIS basic and advanced applications to solve the problems about territorial analysis of the different users (sitar.aragon.es).

  IDEZAR is Zaragoza’s provincial SDI initiative of Aragón.

- IDECanarias: The Spatial Data Infrastructure of the Canaries (IDECanarias) makes available to the users the geographic information produced by the Canary Government through its view-finder and standard services defined following the OGC specifications (idecan.grafcan.es).
There are three local initiatives in the Canary Islands: TeIDe - the SDI initiative of the town hall of Tenerife; IdeCabildo- the local Cabildo of las Palmas of Gran Canary SDI initiative; and Ayuntamiento de las Palmas - the town hall of the Gran Canary Island SDI Initiative.

- **IDECLM**: Following the European INSPIRE Directive and in cooperation with IDEE, the “Junta de Comunidades de Castilla-La Mancha” has initiated the project IDECLM. The aim of the project is to facilitate access to geographic information in the region to all citizens via the Internet (ide.jccm.es).

- **IDECyL**: The Spatial Data Infrastructure of Castilla y Leon (IDECyL) is conceived as a set of georeferenced data and its metadata from the territory of Castilla y Leon. The set of georeferenced data and its metadata is distributed in different geographic information systems. This SDI is accessible via the Internet and services identification and in the selection and access to the data, all in compliance with the specifications and standardized protocols to ensure interoperability and sharing opportunity (sitcyl.jcyl.es).

- **IDEC**: The Spatial Data infrastructure of Catalonia (IDEC) is the platform to interchange and sharing spatial information through Internet. The IDEC involves all public Administrations as the Catalan Government (Generalitat de Catalunya), the Spanish Government, local entities as well as other public and private institutions of Catalonia. IDEC can be defined as a set of technologies, policies, standards and human resources required to acquire process, store, distribute and improve the use of geographic information (geoportal-idec.net). Moreover, as already mentioned, IDEC received an eSDI-Net+ best practice award in 2009.

  The local initiatives are the IDEBarcelona, the SDI initiative of the provincial council of Barcelona, and the IDEC Local the SDI initiative of all the local administrations in Catalonia promoted by the AOC (Administració Oberta de Catalunya).

- **IDEGA**: The Spatial Data Infrastructure of Galicia (IDEGA) gathers, organises and deals with integrated data, metadata and services related to Galicia which might be located geographically. These data come from different sources, nodes and geoportals and cover types, formats, fields, scales and very varied backgrounds. The link http://sitga.xunta.es allows the users to identify, locate, select and access, in a simultaneous and joint way, to a wide variety of resources (Sitga.xunta.es).

  The provincial council of A Coruña is the local SDI initiative from Galicia.

- **IDENA**: IDENA is the answer of Territorial Information System of Navarra (SITNA) to the requirements of INSPIRE and IDEE and thereby joins the global offer of Spatial Data Infrastructure. Through IDENA you can search (direct, by category or by owners), view maps and geographic information (idena.navarra.es).

  The local initiative of Navarra is IDEPamplona’s SDI initiative - the city of Pamplona.

- **IDECV**: The citizen can see in the IDECV the geographic data that is available for the various entities and organisations (icv.gva.es).

- **IDEEX**: The Extremadura Spatial Data Infrastructure is a platform enabled to view and manage information in the Territory through Web services. In this space you can seek, find and overlay geographic information anywhere in the network that meets the standards (ISO / TC 211) and the Open Geospatial Consortium (OGC) (Idextremadura.es).
• IDEIB: The Directorate General of land zoning (Direcció General d'Ordenació del Territory), with the support of the Directorate General of technology and communication (Direcció General de Tecnologia i Comunicacions), is developing the IDEIB, within the framework of the European Directive and IDEE. This project is a priority, as will be the main form of distribution and dissemination of geographic information of the "Govern de les Illes Balears" with the use of electronic means (ideib.cat).

The Balearic Islands have two local initiatives: IDEmallorca - Mallorca’s insular council initiative - and IDEmenorca - Menorca’s insular council initiative.

• IDERioja: The Government of la Rioja has among its main objectives to facilitate the citizen’s access to geographic data that it produces and manages, for which it has developed various tools, accessible through this page. Besides, the government data of la Rioja also can be accessed from any standard viewer, through its WMS: http://wms.larioja.org/request.asp. Another important objective is to promote the development of local SDIs. Therefore, IDERioja launched display and consulting services focused on municipal data (iderioja.larioja.org). Further, IDERioja received an eSDI-Net+ best practice award in 2009.

The already mentioned la Rioja WMS is the local SDI initiative of this autonomous community.

• GeoEuskadi: The portal is aimed at specialised users as well as any people with the need of consulting maps in the Autonomous Community of the Basque Country. Besides, this portal, with the intention of facilitating citizens with the best information and public service access, attempts to offer via the Internet the best necessary and accessible tools for geographical analysis and consultation based on the cartography from the different public institutions and departments of the Basque Government (geo.euskadi.net).

• SITPA-IDEAS: This initiative is born from the union of two concepts, SITPA (Territorial Information System of Asturias) and IDEAS (Spatial Data Infrastructure Asturias). The SITPA is in a consolidation phase within the Corporate Intranet and Internet (cartografia.asturias.com).

• IDERM: The Spatial Data Infrastructure Reference Murcia digital Gateway is the Mapping Service of the Directorate General of Land Management. The Geographic Information provides Reference and tools for their management (cartomur.com).

Two main aspects are common to all the autonomous community initiatives: access to geographic information with the options to search, locate, view, download or request geographic data and the adoption of the framework of INSPIRE and IDEE.
Figure 12: IDEE initiatives
6.6 Common ground floor for the IDEE

IDEE’s cooperation of different administrative levels basic philosophy is to create a SDI where all levels of Government share their information and open the GI for the citizen (similar to Aarhus Convention) (EC-INSPIRE, 2007, p.15).

The national coordinating body of the IDEE is the “Consejo Superior Geográfico” (National Geographical High Council) with representatives from National (9), Regional (17) and Local Authorities (2) and IGN and the Hydrographic Institute of Army. Further, the legal framework is formed by the Royal Decree 1545/2007 that establishes the National Cartographic System (Sistema Cartográfico Nacional) (EC-INSPIRE, 2007, p.21). IDEE is funded by the Ministry of Science and Technology, which aims to demonstrate the technology available.

IDEE is an initiative to integrate data, metadata and geographical information produced in Spain into Internet, which provides to locate, identify and access to such information by its potential users.

The Website for the IDEE (http://www.idee.es) provides access to the main node of distribution and viewing of data and geographical services in Spain. The website should be launched with the nodes and websites of official geographical information under the theme of nature, and other equivalent websites that have been established in the Autonomous Communities. These nodes will in turn be complimented by other institutional, private or enterprise infrastructures to develop the authentic National Spatial Data Infrastructure of Spain.

The permanent Commission of National Geographic High Council (the State’s superior, consultative and planning body within the realms of cartography) formed in 2002 a working group to study and coordinate the establishment of the Spatial Data Infrastructures of Spain (IDEE).
7    Balearic’s Islands’ SDI organisational context

7.1    Introduction

The Balearic Islands have their own administration in the form of Councils. The responsibility of all the Balearic Island case studies is to make the spatial information accessible for all the users. This chapter reviews the organisational aspects of the Balearic Islands case studies. By order, the chapter describes the organisational aspects of the IDEIB, the IDEmallorca and the IDEmenorca case studies.

This chapter deals with the Balearic Islands’ SDI case studies (figure 13). First the chapter presents the institutional structure of the Balearic Islands administration. Second the chapter describes the IDEIB case study, explores the IDEmallorca case study and reviews the IDEmenorca case study. The structure of each of the case studies chapters is as follows: roles, responsibilities and organisational initiatives; triangle organisation structure; organisational aspects; Maturity matrix and SWOT analysis.

Figure 13: Balearic Islands’ SDI case studies

7.2    Institutional structure of the Balearic Islands administration

In the archipelagos, the islands have their own administration in the form of Cabildo or Council. This last point is important for this research as each island has a council. The Statute of Autonomy of the Balearic Islands refers to this in its articles 36 and 37. The government, administration and representation of the islands of Mallorca, Menorca, Ibiza and Formentera and the adjacent islands corresponds to the islands councils. The councils enjoy autonomy in managing their interests in accordance with the Constitution, the statute and the provisions of the acts of parliament (Article 36-Statute of Autonomy of the Balearic Islands, 1983, p12). Each island’s council will be composed of deputies elected by the Parliament. The electing parliament will be the one of Mallorca, Menorca, Ibiza or Formentera (Article 37-Statute of Autonomy of the Balearic Islands, 1983, p12).

The Island Councils have a dual nature; as an organ of the regional administration and as a local administrative body. The consequence of this dual nature is its structure, functioning and powers (cief.es).

The Council is organised based on the presidency, which has executive powers to materialise through presidential decrees. Along with the presidency there’s the Government Committee, representative of the Parliament and in representation of all the political groups with participation in the council. Also, there’s also the executive council that is an organ of government that, in general, has all the executive powers of the Island Council, including those transferred or delegated by the Autonomous Community (cief.es).
7.3 IDEIB case study

7.3.1 IDEIB roles, responsibilities and organisational initiatives

The IDEIB Reference SDI-Node has the region of the Balearic Islands as a scope, with an extension of 4,984 km², a population of 841,669 habitants and a density of 214,58 hab/km² (source: IBESTAT 2001 and Wikipedia). The responsibilities of IDEIB are the distribution and diffusion of the geographic information of the Balearic Islands government with its telematic media (ideib.es). The role of the IDEIB is: public information dissemination, link from the IDEE to the IDEIB, the IDEMallorca and the IDEMenorca, SDI reference node and participant in the IDEE.

SITIBSA created the IDEIB support department in charge of the development of the Spatial Data Infrastructure of the Balearic Islands. Further, SITIBSA is a public enterprise of the Ministry of Mobility and Spatial Planning that depends directly of the Directorate General of Land zonng (SITIBSA.com).

7.3.2 IDEIB triangle organisation structure

IDEIB executive level

The Directorate General of land zoning (DGOT- Direcció General d'Ordenació del Territori) drives the Spatial Data Infrastructure of the Balearic Islands (IDEIB) through the means of its own public company SITIBSA (IDEIB, 2008, p.69).

The Directorate General of land zoning (DGOT- Direcció General d' Ordenació Del Territori) belongs to the Ministry of Mobility and Spatial Planning (Conselleria de Mobilitat i Ordenació del Territori) of the Balearic Islands’ government (figure 14). The powers of the Directorate General of Land zonng are general planning and urban planning, cartography; recovery and improvement of land infrastructures (caib.es).

IDEIB management and operational level

SITIBSA’s IDEIB support department (figure 14) is in charge of the technical implementation. This department, in particular, has the mission of designing and assembling the node of the Government of the Balearic Islands. It also has a mission to promote and perform support tasks so the geographic information producer organisations of the Balearic Islands develop new IDEIB nodes (Mobilitat i Territori nº 1, 2008, p.12).
7.3.3 IDEIB organisational aspects

Orgware

The head of the IDEIB support department rates the level of support that the IDEIB receives within the organisation as good. Besides, the IDEIB survey reveals that a white book of the GIS sector would be useful for the Balearic Islands.

The preferred hierarchical approach for the IDEIB, according to the survey, is bottom-up. Therefore, stressing diversity and heterogeneity is important for this SDI node.

According to the head of the IDEIB support department the IDEIB is at the network GII development stage. However, after the literature review and for this research the “internetwork” stage seems more appropriate (see subchapter 7.3.4).

According to the research survey the IDEIB gives support to all users and interested people in SDI matters. Thus specially the administration of the Balearic Islands Government receives support from the IDEIB.

The aspects that have limited the expansion of the IDEIB node, according to the head of the IDEIB support department, are three. One is Gilfoyle’s (2004) general technology and data problems constraint. The other two are Gilfoyle’s (2004) specific constraints: no information strategy, leading to lack of vision, imagination and innovation (lack of strategy general constraint); no standards for data (technology and data problems general constraint).

Humanware

People and users

In the IDEIB the GIS staff is different from the SDI staff, according to the survey. There are three permanent employees in the GIS unit and three SDI permanent employees. Most employees have graduate qualifications. The staff within the IDEIB’s department of support regularly has the opportunity to update their skills through seminars, conferences, short courses or formal education.

According to the head of the IDEIB support department in the IDEIB department of support
the functions covered are: SDI Manager, System support and user support.

The IDEIB geoportal isn’t based on a user’s requirement analysis, according to the survey. Moreover, there are procedures to assess the IDEIB geoportal usage and the user’s satisfaction. Also, there are service performance measurements and measured numbers of accesses to services, as stated by the head of the IDEIB support department in the survey.

**Partnerships and relationships**

According to the head of the IDEIB support department the IDEIB maintains partnerships with a few public organisations by the signing of agreements of the General Directorate of Territorial Administration with different administrations to share the cartography and to participate with the IDEIB. The existing partnerships are with the following organisations: Council of Mallorca, Council of Menorca, Council of Ibiza, Council of Formentera, University of the Balearic Islands and the Land Registry. Also, agreement proposals were sent to the 66 municipalities of the Balearic Islands and were signed with the following 17 municipalities: Alcudia, Algaida, Bunyola, Calvia, Campanet, Costitx, Esporles Estellencs, Felanitx, Inca, Llota, Llucmajor, Mancor de la Vall, Marratxi Puigpunyent, Sencelles and Salinas.

The level of the IDEIB’s collaboration with administrative levels assessed in the survey ranges from poor to very good. The head of the IDEIB support department rated the collaboration levels according to his knowledge. The level of collaborations of the IDEIB with the town halls is moderate. Then, the level of cooperation of the IDEIB with the provincial or island council is very good. Further, the IDEIB’s collaboration level with organisations of autonomous communities is moderate. Additionally, the collaborations of the IDEIB with the state are good. The IDEIB has a good collaborating level with the educational institutions. Finally, the IDEIB has a poor cooperation level with the non-governmental organisations.

The most common duration of collaborations of the IDEIB with other organisations, according to the head of the IDEIB support department, is long term and permanent. Further, in general IDEIB’s partnerships for sharing data and resources resulted in a major benefit to the other organisation, according to the head of the IDEIB support department. For the IDEIB the most important benefits of establishing data sharing partnerships are: less duplication of effort and resources, single authoritative source of data, reduced request of data by other authorities and better decision making, as stated by the head of the IDEIB support department. Then, the cost saving is seen as important. Finally, the improved service to rate payers is not considered important by the IDEIB, according to the survey.

**Infoware**

The infoware is the ware that presents most obstacles in the IDEIB, as stated by the head of the IDEIB support department.

According to the head of the IDEIB support department the main data providers of the IDEIB are the government and the councils. There are 8 organisations that provide data to the IDEIB. Additionally, the accompanying data documents of each of the providers metadata is in Catalan, Spanish, German and English. Further, the geographical names are managed in Catalan. Besides, the bilingual need of having to provide information in Spanish and Catalan isn’t a problem for the IDEIB.

The IDEIB has 7,774 information layers that can be included in INSPIRE themes. The IDEIB’s five most numerous ISO themes by order are: transportation (160 metadata); boundaries (151 metadata); environment (82 metadata); elevation (59 metadata) and inland waters (33 metadata). The least numerous ISO themes are climatology (1 metadata) and
geoscientific information (4 metadata), IDEIB has 17 WMS, covering the following topics: aerial image, bioatles, boundaries, DEM, Geosciences, health, hydrology, Territorial Model of the Balearic Islands (MTIB), MedIsola3d Baleares, Orthophoto, Insular Territorial Plan (Pla Territorial Insular – PTI) Eivissa and Formentera, topography, tourism and transport.

SITIBSA, in charge of the IDEIB has created and published metadata. The creation of metadata started in 2009, according to the head of the IDEIB support department. There’s a metadata catalogue with 7,387 metadata in four languages. The metadata standard adopted is 19115 ISO.

Though the survey it’s known that the IDEIB has a quality assessment and this includes positional accuracy and exactitude accuracy. Also, there are times series available for the orthophotos, as stated by the head of the IDEIB support department.

The head of the IDEIB support department in the research survey rates as very important obstacles for a SDI organisation data sharing partnerships: poorly documented data, management or lack of political support, privacy statement and communication of information technology/network infrastructure. Then, the head of the IDEIB support department considers important the following sharing obstacles: scattered data without control within and between organisations, data without quality, SDI without standards, copyright restrictions and time and effort required to establish agreements.

Legal and funding framework

The board of directions of the DGTO in May 2007, approved the tasks needed to create the IDEIB, according to the head of the IDEIB support department.

The government of the Balearic Islands funds the IDEIB according to the survey. The annual budget is of 150,000 Euros.

7.3.4 IDEIB maturity matrix

The head of the IDEIB support department considers that the IDEIB is at the network GII development stage. However, after the literature review and for this research a new “internetwork” stage between the intermediary stage and the network stage seems more appropriate. The main reason is that the IDEIB still has some identified bottlenecks (specifically infoware bottlenecks). Also, even though IDEIB has done efforts to collaborate with the IDEmallorca and the IDEmenorca there still isn’t a network organisation type of relationship between them. Nonetheless, it can be discussed if the lack of a network relationship between the Balearic Islands SDIs is due to IDEmallorca and IDEmenorca not being at the network stage. But, the IDEIB being the autonomous communities’ SDI should probably be the one uncharged of forging the relationships and collaborations (this is where a CCC might be useful as well). Anyway, IDEIB being at the “internetwork” stage involves that some organisational bottlenecks still exist and the organisation desires a new and better innovative situation.

Also, a survey question served to find out the most important aspects for the IDEIB at its GII stage of development. The aspects are described from the new “internetwork” stage. In first place communication was rated the most important aspect. Open communication channels should be strived for at the “internetwork” stage. Vision and leadership were rated in second place. Combining the intermediary and network literature the vision should be developed with all stakeholders and starting to be created and supported by all, and reviewed. Also, combining the intermediary and network literature, leadership is still questioned but starting to be respected by all stakeholders. In third place the self-organising ability aspect was
rated. In the “internetwork” combined intermediary and network literature the self-organisation ability would serve for neutral problem negotiation and at the same time starting to work on innovation.

<table>
<thead>
<tr>
<th>Aspect</th>
<th>“Internetwork”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td>Open with public parties and wanted to be interactive between all</td>
</tr>
<tr>
<td>Vision</td>
<td>Developed with all stakeholders and started to be shared, and reviewed</td>
</tr>
<tr>
<td>Leadership</td>
<td>Questioned but starting to be respected by all stakeholders</td>
</tr>
<tr>
<td>Self-organising ability</td>
<td>Neutral problem negotiation starting working on innovation</td>
</tr>
</tbody>
</table>

Table 5: IDEiB maturity matrix according to the response survey

### 7.3.5 IDEiB SWOT analysis

A SWOT analysis audits the IDEiB and its environment. It is a way to find resources and capabilities available in the IDEiB for the competitive environment in which it operates. The analysis has into consideration the relevant eSDI-Net+ indicator weighting, the research literature and the survey findings of the IDEiB.

<table>
<thead>
<tr>
<th>IDEiB SWOT analysis</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strengths</strong></td>
<td><strong>Weaknesses</strong></td>
</tr>
<tr>
<td>• Information layers that can be included in INSPIRE themes</td>
<td>• IDEiB doesn’t have partners from the private sector</td>
</tr>
<tr>
<td>• Information layers provided with a visualization service (WMS)</td>
<td>• No existence of a socio-economic impact analysis published</td>
</tr>
<tr>
<td>• Information provided with standard metadata (19115)</td>
<td>• IDEiB doesn’t have database support or production functions</td>
</tr>
<tr>
<td>• Enablement of value adding services (spatial analysis, cartography etc)</td>
<td>• Infoware is the ware with more obstacles</td>
</tr>
<tr>
<td>• Existing geoportal facility</td>
<td>• Insufficient staff numbers to implement and operate GIS (only 3 permanent SDI employees)</td>
</tr>
<tr>
<td>• Discovery service</td>
<td>• No strategy of information, leading to lack of vision, imagination and innovation</td>
</tr>
<tr>
<td>• Metadata catalogue</td>
<td>• Technology and data problems</td>
</tr>
<tr>
<td>• View service</td>
<td>• There are no standards for data</td>
</tr>
<tr>
<td>• SITIBSA is a strong leading party developing the IDEiB</td>
<td>• IDEiB, in the partnership, has less benefits than the other organisation</td>
</tr>
<tr>
<td>• IDEiB has local authority partners</td>
<td>• IDEiB has other public body partners</td>
</tr>
<tr>
<td>• IDEiB has user training organised and/or offered</td>
<td>• User’s training organised and/or offered</td>
</tr>
<tr>
<td>• Existence of a socio-economic impact analysis</td>
<td>• Specific SDI budget</td>
</tr>
<tr>
<td>• Specific SDI budget</td>
<td>• Legal status of SITIBSA developing the IDEiB</td>
</tr>
<tr>
<td>• Legal status of SITIBSA developing the IDEiB</td>
<td>• IDEiB deals with legal aspects(public sector information-PSI)</td>
</tr>
<tr>
<td>• IDEiB deals with legal aspects(public sector information-PSI)</td>
<td>• All languages relevant for the</td>
</tr>
<tr>
<td>• All languages relevant for the</td>
<td></td>
</tr>
</tbody>
</table>
IDEIB are covered
- IDEIB is also in a foreign language (English and German)
- Great level of openness of the IDEIB with its data services (specially WFS)
- IDEIB targeted at public sectors, private sectors, universities and citizens
- Procedures to assess SDI usage and user satisfaction
- Service performance measurement
- Good support of the IDEIB by the organisation
- IDEIB at the “Internetwork” stage of GII development
- IDEIB has SDI Manager, System support and user support and functions
- 7387 metadata in the catalogue
- Time series are available for orthophotos at the IDEIB

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>• IDEIB targeted at the public sector and private sector, universities and citizens</td>
<td>• IDEIB targeted at the public sector and private sector, universities and citizens</td>
</tr>
<tr>
<td>• Long term partnerships</td>
<td>• Long term partnerships</td>
</tr>
</tbody>
</table>

Table 6: IDEIB SWOT analysis

7.4 IDEmallorca case study

7.4.1 IDEmallorca roles, responsibilities and organisational initiatives

The IDEmallorca SDI-Node’s scope is Mallorca with an extension of 3.622 km2, a population of 676,516 habitants and a density of 214, 8 hab/km2 (source: IBESTAT 2001 and Wikipedia). The responsibilities of IDEmallorca are to integrate through the Net the geographical data, metadata, services and information produced at the Council of Mallorca, providing the potential users the localisation, identification, selection and access to these resources, through a geoportal (conselldemallorca.net). The roles are: public information dissemination; link from the IDEE to the IDEmallorca and the IDEmenorca through the IDEIB; SDI reference node; participant in the IDEE and the IDEIB.

The IDEmallorca is an initiative of the Insular Council of Mallorca to create the Island’s Infrastructure of Spatial Data. The Council of Mallorca, as an institution of the government, administration and representative of the island of Mallorca has a Territorial Information System (SIT) that contributes to improve managing its areas of competence and services. The aim is making possible the access of the geographical information produced in the Council of Mallorca to all users, either to the workers of the Council, Town Councils or general society (conselldemallorca.net). The Island Council of Mallorca and, briefly named,
Consejo de Mallorca (Consell Insular de Mallorca or Consell de Mallorca in Catalan) is the institution of self-government of the island of Mallorca.

### 7.4.2 IDEmallorca triangle organisation structure

#### IDEmallorca executive level

The Department of Treasury Public Works and Innovation (Departament d'Hisenda, Obres Públiques i Innovació) (figure 15) drives the IDEmallorca at the executive level. The Insular direction of general services (Direcció insular de serveis generals), Insular direction of treasury and innovation (Direcció insular d’ hisenda i presupost), Insular direction of innovation (Direcció insular d’ innovació) and the Insular managing of roads (Direcció insular de carreteres) build this department.

The functions of the Department of Treasury Public Works and Innovation (Departament d'Hisenda, Obres Públiques i Innovació) are the ones related to the sector of the administrative activity of the department, which the legislation assigns to the Consell de Mallorca. The wide variety of functions goes from checking the administrative proceedings to the ones related to the technical inspection of vehicles. Therefore, the department’s most relevant function for this research is “to promote the use of the technologies of the information in the administrative activity, in the relations between public administrations, and also in the relations between citizens and the institutions” (conselldemallorca.com). Furthermore, more important for this research, the specific objectives of the insular innovation direction are: design and implement the strategic plan for modernisation and quality for the council of Mallorca, design and implement the strategic digital management, design and implement the strategic citizen plan, improve access to new technologies and promote the information society and communication.

#### IDEmallorca management level

At the management level the IDEmallorca has the technological direction of the Information technology and telecommunication service of Mallorca’s council (figure 15). Moreover, the Information technology and telecommunication service has the participation of the different departments of the institution for the creation and maintenance of the IDEmallorca.

The overall objective of the Information technology and telecommunication service is planning coordinating and evaluating activities for the development and provision of information and telecommunications systems of the Council of Mallorca. It is a service with clear internal management, focusing on services and other departments of the Council of Mallorca (conselldemallorca.com).

#### IDEmallorca operational level

The Territorial Information Service (SIT-Servei d’ Informació Territorial) (figure 15) is uncharged of the technical implementation of the IDEmallorca (conselldemallorca.com).
7.4.3 IDEmallorca organisational aspects

Orgware

The Territorial Information Service unit rate the level of support the IDEmallorca receives within the organisation as limited. Besides, the Territorial Information Service unit agree that a white book for the GIS sector of the Balearic Islands would be useful.

The preferred hierarchical approach for the IDEmallorca, according to the survey, is top-down. Therefore, recognising standardisation and uniformity is important for this SDI node.

According to the Territorial Information Service unit the IDEmallorca is at the network GII development stage (see subchapter 7.4.4).

The IDEmallorca, according to the survey, doesn’t give technical support to any organisation or department. Further, the orgware is the geoware that presents more obstacles in the IDEmallorca, as stated by the Territorial Information Service unit.

The aspects that have limited the expansion of the IDEmallorca initiative are six, according to the Territorial Information Service unit. Two, are Gilfoyle’s (2004) following general constraints: insufficient awareness, poor perception and lack of commitment; lack of strategy. Thereafter, four are Gilfoyle’s (2004) specific constraints: insufficient staff numbers to implement and operate GIS (inadequate resources general constraint); GIS is not integrated into the culture of decision making (lack of strategy general constraint); insufficient or inadequate training of users (inadequate IT skills and support general constraint) and lack of awareness of data as a corporate resource (technology and data problems general constraint).

Humanware

People and users

According to the Territorial Information Service unit in the IDEmallorca the GIS staff is the same as the SDI staff. There are only two non-permanent employees to operate and manage the GIS and SDI of the council of Mallorca. Additionally, both employees have
graduate and postgraduate educational levels. Further, the staff within the organisational SDI unit regularly has the opportunity to update their skills through seminars, conferences, short courses or formal education.

In the Territorial Information Service unit, according to the survey, the functions covered are: SDI Manager, System support, database support, user support and production functions.

There are procedures to assess the IDEmallorca geoportal usage and the user’s satisfaction, as stated by the Territorial Information Service unit. Also, there are service performance measurements, in other words, the measure of the number of accesses to services, according to the Territorial Information Service unit.

**Partnerships and relationships**

The IDEmallorca by agreements has partnerships with about six organisations, as stated by the Territorial Information Service unit.

The level of the IDEmallorca’s collaboration with administrative levels assessed in the survey ranges from poor to very good. The Territorial Information Service unit rated the collaboration levels according to their knowledge. The level of collaborations of the IDEmallorca with the town halls is poor. Moreover, the level of cooperation of the IDEmallorca with the provincial or island council is very good. Further, the IDEmallorca has a moderate level of collaboration with organisations of autonomous communities. Then, the collaborations of the IDEmallorca with the state are good. Additionally, the IDEmallorca has a very good collaboration level with the educational institutions. Finally, the IDEmenorca has a moderate cooperation level with the non-governmental organisations.

The most common duration of collaborations of the IDEmallorca with other organisations, according to the survey, is long term, in other words permanent. In general the IDEmallorca’s partnerships for sharing data and resources resulted in a major benefit to the other organisation, as stated by the Territorial Information Service unit.

For the IDEmallorca, according to the Territorial Information Service unit, the most important benefits of establishing data sharing partnerships are less duplication of effort and resources, cost savings and better decision making. Then, the reduced request of data by other authorities is important for the IDEmallorca, according to the survey. Finally, the improved quality of data isn’t important, according to the Territorial Information Service unit.

**Infoware**

The main data providers of the IDEmallorca, according to the survey, are from the same Council of Mallorca. And these data providers are the: Public Works Department, Department of territory, Department of Environment and Department of Heritage. Further, the accompanying data documents of each of the providers’ metadata are in Catalan. Thereafter, logically the geographical names are in Catalan. The bilingual need of having to provide information in Spanish and Catalan isn’t a problem for the IDEmallorca.

The IDEmallorca hasn’t published any list of information layers that can be included in INSPIRE themes. However, the IDEmallorca has 7 WMS and 4 WFS. The covered topics of the WMS are: Sector Master Plans (Plans Directors Sectorials), interest points, heritage, transport and limits. Further, the covered WFS topics are: Sector Master Plans (Plans Directors Sectorials), interest points, transport and administrative limits.

In the IDEmallorca, according to the survey, there are quality assessments and this includes
logical consistency and integrity of objects. Further, there aren’t times series available for the orthophotos.

The Consell of Mallorca in charge of the IDEmallorca hasn’t created or published metadata. Metadata creation, as stated by the Territorial Information Service unit, will start this year 2010. Metadata hasn’t started because of the insufficient human resources. Also, the metadata catalogue will, also, start building this year 2010. Further, there was no response from how many organisations provide data to IDEmallorca.

The IDEmallorca, through the survey, rated as a very important obstacle for a SDI organisation: data sharing scattered data without control within and between organisations, data without quality and cost and price of data. Then, the Territorial Information Service unit consider as important for data sharing the following aspects: SDI without standards, poorly documented data, lack of confidence or goodwill, management or lack of political support plus search and access to appropriate data.

**Legal and funding framework**

There is no law or decree creating the IDEmallorca according to the Territorial Information Service unit. However, the SDI started the year 2008.

The Council of Mallorca funds the IDEmallorca node. The annual budget for the IDEmallorca is approximately 20,000 Euros, according to the survey.

**7.4.4 IDEmallorca Maturity matrix**

According to the Territorial Information Service unit the IDEmallorca is at the network GII stage. However, because IDEmallorca lacks metadata and a metadata catalogue, for this research the intermediary stage seems more correct. Further, the objective of the IDEmallorca is to create metadata and a metadata catalogue this year 2010, according to the survey. Therefore, at the end of this year 2010, maybe it will be possible to affirm that IDEmallorca is at the network GII stage. If IDEmallorca was at the network stage, according to literature, few organisational bottlenecks would exist and the change process would be driven by innovative motives. The GII would have become a network organisation with equal players, a clear vision which would operate pro-actively. However, this isn’t the reality of the IDEmallorca. Therefore, for this research it is considered that the intermediary stage suits the IDEmallorca better. As stated by literature, the change in the intermediary stage is not promoted from the top, but is initiated at the bottom (Kok, 2005, p.703). Moreover, the strategy is not only focusing on information creation and exchange, but also aims to promote use of the information (Van Loenen, 2006, p. 50).

Also, a survey question served to find out the most important aspects for the IDEmallorca at the GII stage. In this paragraph each aspect is described by order of the importance from the survey results (table 7). The aspects are described first from the network GII stage and then from the intermediary stages. First, in the network stage the self-organisation ability is actively working on innovation. Thereafter, this same aspect at the intermediary stage is actively helping to solve identified problems. Second, the leadership at the network stage is respected by all stakeholders. In addition for the intermediary stage leadership is accepted. Third, open an interactive communication takes place in the network stage. And in the intermediary stage communication is open between all the stakeholders. Fourth, a commonly shared and frequently reviewed vision is present at the network stage. On the contrary in the intermediary stage the vision is in implementation.
### 7.4.5 IDEmallorca SWOT analysis

A SWOT analysis audits the IDEmallorca and its environment. SWOT is a way to find resources and capabilities available in the IDEmallorca for the competitive environment in which it operates. The analysis has into consideration the relevant eSDI-Net+ indicator weighting for the research and the literature and survey findings of the case studies.

<table>
<thead>
<tr>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Information layers provided with a visualization service (WMS)</td>
<td>• No Information layers that can be included in INSPIRE themes</td>
</tr>
<tr>
<td>• Information layers provided with a download service (WFS)</td>
<td>• Information not provided with standard metadata</td>
</tr>
<tr>
<td>• Enablement of value adding services (spatial analysis, cartography etc)</td>
<td>• No discovery service</td>
</tr>
<tr>
<td>• Existing Geoportal facility</td>
<td>• IDEmallorca Geoportal not based on a user requirement analysis</td>
</tr>
<tr>
<td>• View service</td>
<td>• No metadata catalogue</td>
</tr>
<tr>
<td>• The Council of Mallorca is a strong leading party developing the IDEmallorca</td>
<td>• No existence of a published socio-economic impact analysis</td>
</tr>
<tr>
<td>• Specific SDI budget</td>
<td>• IDEmallorca isn’t in a foreign language</td>
</tr>
<tr>
<td>• Legal status of the Council of Mallorca developing the IDEmallorca</td>
<td>• Limited support of the IDEmallorca by the organisation</td>
</tr>
<tr>
<td>• IDEmallorca has local authority partners</td>
<td>• Time series aren’t available for orthophotos at the IDEmallorca</td>
</tr>
<tr>
<td>• IDEmallorca has other public body partners</td>
<td>• Orgware is the ware with more obstacles</td>
</tr>
<tr>
<td>• User’s training organised and/or offered</td>
<td>• Insufficient staff numbers to implement and operate GIS (only 2 people)</td>
</tr>
<tr>
<td>• Specific SDI budget</td>
<td>• Insufficient awareness, poor perception and lack of commitment</td>
</tr>
<tr>
<td>• Legal status of the Council of Mallorca developing the IDEmallorca</td>
<td>• Lack of strategy</td>
</tr>
<tr>
<td>• IDEmallorca deals with legal aspects (public sector information-PSI)</td>
<td>• GIS not integrated into the culture of decision making</td>
</tr>
<tr>
<td>• All languages relevant for the IDEmallorca covered</td>
<td>• Insufficient or inadequate training of users</td>
</tr>
<tr>
<td>• Great level of openness of the IDEmallorca with its data</td>
<td>• Lack of awareness of data as a corporate resource</td>
</tr>
<tr>
<td>• None of the data of the Council of Mallorca has metadata</td>
<td>• None of the data of the Council of Mallorca has metadata</td>
</tr>
</tbody>
</table>
services (specially WFS)
- IDEmallorca targeted at public sectors, private sectors, universities and citizens
- Procedures to assess SDI usage and user satisfaction
- Service performance measurement
- IDEmallorca at the intermediary stage of GII development
- IDEmallorca has SDI Manager, System support, database support, user support and production functions

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>• IDEmallorca targeted at the public sector and private sector, universities and citizens</td>
<td></td>
</tr>
<tr>
<td>• Long term partnerships</td>
<td>• No metadata catalogue</td>
</tr>
<tr>
<td></td>
<td>• Time series aren't available for the orthophotos</td>
</tr>
<tr>
<td></td>
<td>• IDEmallorca, in the partnership, has less benefits than the other organisation</td>
</tr>
</tbody>
</table>

Table 8: IDEmallorca SWOT analysis

7.5 IDEmenorca case study

7.5.1 IDEmenorca roles, responsibilities and organisational initiatives

The IDEmenorca SDI-Node's scope is the island of Menorca with an extension of 6,94 km², a population of 71,524 habitants and a density of 124,85 hab/km² (source: IBESTAT 2001 and Wikipedia). The responsibilities of this SDI are to make accessible to everyone the cartographic information available in the Island Council. IDEmenorca is a step to facilitate to the cartography users and citizens in general the knowledge of what there is where it is and how to get it. And when possible, the cartographic information is supplied as well as the description of its characteristics (metadata) so it can be used successfully (cartografia.cime.es). Thereafter, the roles are: public information dissemination; link from IDEE to the IDEmallorca through IDEIB; SDI reference node; and participant in the IDEE and the IDEIB.

The IDEmenorca is Menorca's insular council's SDI. Menorca's cartography service belonging to the Department of land planning (Departament d' Ordenació del Territori) of Menorca's council covers the islands' council administrative activity matters of planning and land management, urban, coastal and habitability (cartografia.cime.es). The Island Council of Menorca and, briefly named, Consejo de Menorca (Consell Insular de Menorca or Consell de Menorca in Catalan) is the institution of self-government of the island of Menorca.

7.5.2 IDEmenorca triangle organisation structure

IDEmenorca executive and management level

The Department of land planning (Departament d' Ordenació del Territori), covers the islands' council administrative activity matters of planning, land management, urban, coastal and habitability (figure 16).
IDEmenorca operational level

Menorca’s cartography technical group (Grup tècnic cartogràfic) (figure 16) is in charge of the management and operational levels of IDEmenorca (cartografia.cime).

![Figure 16: IDEmenorca triangular organisation structure](image)

7.5.3 IDEmenorca organisational aspects

**Orgware**

The head of Menorca's cartography technical group rates the level of support that the IDEmenorca receives within the organisation as limited. Besides, the survey reveals that a white book of the GIS would be useful for the Balearic Islands SDI nodes.

The preferred hierarchical approach for the IDEmenorca, according to the survey, is bottom-up. Therefore, stressing diversity and heterogeneity is important.

According to the head of Menorca's cartography technical group the IDEmenorca is at the exchange and standardization in the technical plan GII development stage (see subchapter 7.5.4).

The IDEmenorca gives support to all the departments of the Council of Menorca and the town halls of Menorca, as stated by the head of Menorca's cartography technical group. Besides, the departments that receive more support are Territorial Planning, Environment, Agriculture, Historical heritage, Urban Planning (town halls).

The head of Menorca's cartography technical group stated that the IDEmenorca’s vision of the corporate GIS is separate from the SDI, although both are closely related concepts (specially when the same people take care of both). The corporate GIS offers internal service (local councils and the Council), it also deals with the production of data (there are three draughtsman in the Council that do the local infrastructure survey amongst other tasks). The SDI provides an added-value for information; it diffuses information outside and looks for a feed-back. The concept of SDI as a network that circulates in all directions is important. In the near future the IDEmenorca will try to involve the private sector, professional associations, etc.

The aspects that have limited the expansion of the IDEmenorca initiative, according to the
survey, are Gilfoyle’s (2004) following five specific aspects: insufficient staff numbers to implement and operate GIS (inadequate resources general constraint); bad experience of a previous GIS (insufficient awareness, poor perception and lack of commitment general constraint); neglect of human affairs - too technical emphasis (lack of strategy general constraint); inadequate equipment (technology and data problems): lack of awareness of data as a corporate resource (technology and data problems general constraint).

Humanware

An important finding of the survey for the IDEMenorca is that the humanware is the ware that presents more obstacles in the IDEMenorca.

People and users

In the IDEMenorca the GIS staff is the same as the SDI staff, according to the head of Menorca's cartography technical group. For IDEMenorca there’s one employee of the Council of Menorca (CIME) and another one of the local informatics system of Menorca (SILME). Additionally, in the IDEMenorca the employees have graduate and postgraduate academic backgrounds. As well the staff within the organisational SDI unit regularly has the opportunity to update their skills through seminars, conferences, short courses or formal education.

The IDEMenorca has a SDI Manager and System support functions, according to the survey.

No response was given about procedures to assess the IDEMenorca geoportal usage and the user’s satisfaction in the survey. Further, there are service performance measurements, according to the head of Menorca’s cartography technical group.

Partnerships and relationships

The IDEMenorca by agreements has partnerships, according to the head of Menorca's cartography technical group, with the Council of Menorca, the Council of Mallorca and the government of the Balearic Islands. Since IDEMenorca is at an early stage of SDI implementation the agreements with private organisations haven’t been worked on, yet.

The level of collaborations of the IDEMenorca with respect to different administrative levels, according to the survey, is provided in the following lines. The head of Menorca's cartography technical group rated the collaboration levels according to his knowledge. The level of collaboration of the IDEMenorca with town halls is moderate. Moreover, the level of cooperation of the IDEMenorca with the provincial or island council is good. Further, the IDEMenorca collaborations with organisations of autonomous communities are moderate. Thereafter, the collaborations of the IDEMenorca with the state are poor. Also, the IDEMenorca has a poor collaboration level with the educational institutions. Finally, the IDEMenorca has a poor cooperation level with the non-governmental organisations.

The most common duration of collaborations of the IDEMenorca with other organisations, according to the head of Menorca's cartography technical group is medium term and permanent. In general IDEMenorca partnerships for sharing data and resources resulted in approximately the same benefit to both organisations, according to the survey. For the IDEMenorca the most important benefits of establishing data sharing partnerships are improved quality of data and single authoritative source of data, according to the head of Menorca's cartography technical group. Then, less duplication of effort and resources, reduced request of data by other authorities and better decision making are important for the
IDEmenorca, as stated by the head of Menorca’s cartography technical group. Finally, the improved service to rate payers isn't important for the IDEmenorca, according to the survey.

**Infoware**

The main data providers of the IDEmenorca, according to the survey, are the Balearic Government (IDEIB), and the same Council of Menorca. Further, the accompanying data document of each of the providers’ metadata is in Catalan. Then, the geographical names are in Catalan. The bilingual need of having to provide information in Spanish and Catalan isn’t a problem for the IDEmenorca.

The IDEmenorca hasn’t published any list of information layers that can be included in INSPIRE themes. Moreover, the IDEmenorca has 10 WMS covering the following topics: Insular Territorial Plans (Pla Territorial Insular), Special Interest Natural Area (Área Natural d’Especial Interés- ANEI), Sector Master Plan (Pla Director Sectorial), CORINE land cover map, Horse route and orthophotos.

In the IDEmenorca, according to the head of Menorca’s cartography technical group, there are quality assessments and these include logical consistency and integrity of objects. However, there aren’t times series available for the orthophotos, according to the survey.

The Consell of Menorca in charge of the IDEmenorca has created and published metadata. The creation of metadata started in 2008, according to the survey. However, the metadata doesn’t follow the official standards. IDEmenorca is now migrating the information to have a metadata with standards. There’s a metadata catalogue with 699 metadata.

The head of Menorca's cartography technical group rates scattered data without control within and between organisations and find and access to appropriate data as very important obstacles for a SDI organisation. Then, the head of Menorca's cartography technical group considers as important for data sharing the following aspects: data without quality, poorly documented data, lack of confidence or goodwill, management or lack of political support, cost, price of data, legal liability on the part of the organisation, copyright restrictions, privacy statement, time and effort required to establish agreements, communication of information technology and inability to find solutions to SDI problems.

**Legal and funding framework**

There is no law or decree creating the IDEmenorca, according to the survey. There is only an agreement of collaboration between eight town halls and the Island Council with the objective of creating the IDEmenorca.

The IDEmenorca has an allocated budget as stated by the head of Menorca's cartography technical group. Actually the Council of Menorca is funding the 40% of the budget and the Ministry of Industry is funding the 60% of the budget. For the period of 2009 to 2010 extra funding comes as a grant from the Ministry of Industry. One of IDEmenorca’s tasks is to appear in the current budget of the Council of Menorca. Besides, another task is to have 70% of the funding coming from the Council of Menorca and 30% from the town halls.

**7.5.4 IDEmenorca Maturity matrix**

In the survey the head of Menorca's cartography technical group considered the IDEmenorca being at the exchange and standardisation on technical level GII stage (table 9). This implies that a sense of communality is developed which may result in common
short-term goals and recognition of common bottlenecks. The primary focus of the discussions is on standardisation and framework datasets (Kok, 2005, p. 703).

The GI aspects at the exchange stage by importance for the IDEmenorca, according to the head of Menorca's cartography technical group, are as follows: vision, leadership, self-organisation ability and communication. The characteristics of the GI aspects found in the literature are presented in the following lines. In the exchange stage, all SDI stakeholders share a negotiated vision. Thereafter, the awareness of the importance of coordination is increasing and potential leaders are discussed. Besides, the self organisation's ability at the exchange stage is when the community identifies problems and offers solutions to the decision makers. Finally, communication may focus on the exchange of information with other organisations. This increasing focus on external communication leads to the need for standardisation, data exchange, and one time data collection.

<table>
<thead>
<tr>
<th>Aspect</th>
<th>Exchange standardisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vision</td>
<td>Developed with all stakeholders</td>
</tr>
<tr>
<td>Leadership</td>
<td>Questioned</td>
</tr>
<tr>
<td>Self-organising ability</td>
<td>Neutral problem negotiation</td>
</tr>
<tr>
<td>Communication</td>
<td>Open between public parties</td>
</tr>
</tbody>
</table>

Table 9: IDEmenorca maturity matrix according to the response survey

7.5.5 IDEmenorca SWOT analysis

A SWOT analysis audits the IDEmenorca and its environment. SWOT is a way to find resources and capabilities available in the IDEmenorca for the competitive environment in which it operates. The analysis has into consideration the relevant eSDI-Net+ indicator weighting for the research and the literature and survey findings of the case studies.

<table>
<thead>
<tr>
<th>IDEmenorca SWOT analysis</th>
<th>Strengths</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strengths</td>
<td>• 699 database registries</td>
<td>• Information layers can’t be included in INSPIRE themes</td>
</tr>
<tr>
<td></td>
<td>• Information layers provided with a visualization service (WMS)</td>
<td>• Information layers not provided with a download service (WFS)</td>
</tr>
<tr>
<td></td>
<td>• Enablement of value adding services (spatial analysis, cartography etc)</td>
<td>• IDEmenorca’s Geoportal not based on a user requirement analysis</td>
</tr>
<tr>
<td></td>
<td>• Existing geoportal facility</td>
<td>• No discovery service</td>
</tr>
<tr>
<td></td>
<td>• Metadata catalogue (but not standardised)</td>
<td>• No specific SDI budget</td>
</tr>
<tr>
<td></td>
<td>• View service</td>
<td>• IDEmenorca doesn’t have partners from the private sector</td>
</tr>
<tr>
<td></td>
<td>• The Council of Menorca is a strong leading party developing the IDEmenorca</td>
<td>• Medium level of openness of the IDEmenorca with its data services (specially WFS)</td>
</tr>
<tr>
<td></td>
<td>• Legal status of the Council of Menorca developing the IDEmenorca</td>
<td>• IDEmenorca doesn’t have database support, user support and production functions</td>
</tr>
<tr>
<td></td>
<td>• IDEmenorca has local authority partners</td>
<td>• Insufficient staff numbers to implement and operate GIS (1 permanent employee)</td>
</tr>
<tr>
<td></td>
<td>• IDEmenorca has other public body partners</td>
<td>• Bad experience of a previous GIS</td>
</tr>
<tr>
<td></td>
<td>• User’s training organised and/or offered</td>
<td></td>
</tr>
</tbody>
</table>
- IDEmenorca deals with legal aspects (public sector information-PSI)
- All languages relevant for the IDEmenorca are covered
- IDEmenorca targeted at public sectors, private sectors, universities and citizens
- Service performance measurement
- IDEmenorca has a SDI Manager and System support functions

- Neglect of human affairs - too technical emphasis
- Inadequate equipment (hardware and software)
- Lack of awareness of data as a corporate resource
- Current metadata of IDEmenorca doesn’t follow the official standards
- Small number of partnerships due to initial stage of the SDI
- Limited support of IDEmenorca by the organisation
- No database support or production support in IDEmenorca
- Humanware is the ware with more obstacles in IDEmenorca
- Medium term collaborations in IDEmenorca
- Time series aren’t available for orthophotos at the IDEmenorca
- IDEmenorca doesn’t provides information in a foreign language (English)
- No specific SDI budget for the IDEmenorca by the Council of Menorca
- There isn’t any SDI database support, user support or production functions

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Private organisation partnerships are a future objective for IDEmenorca</td>
<td>• Medium term partnerships</td>
</tr>
<tr>
<td>• Work towards the network GII stage (now exchange and standardisation in the technical plan)</td>
<td>• No partnerships with private organisations</td>
</tr>
<tr>
<td>• Objective of appearing in the current budget of the Council of Menorca</td>
<td></td>
</tr>
<tr>
<td>• Work towards long term partnerships (now medium term)</td>
<td></td>
</tr>
</tbody>
</table>

Table 10: IDEmenorca SWOT analysis
### Key characteristics of the Balearic Islands SDIs

In table 11 there’s a summary of the most important characteristics of the Balearic Islands’ SDIs.

<table>
<thead>
<tr>
<th></th>
<th>IDEIB</th>
<th>IDEmallorca</th>
<th>IDEmenorca</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SDI hierarchical vision</strong></td>
<td>Bottom-up</td>
<td>Top-down</td>
<td>Bottom-up</td>
</tr>
</tbody>
</table>
| **Triangle organisation pattern** | • Executive level: Directorate General of land zoning  
  • Management level: SITIBSA's IDEIB support department  
  • Operational level: SITIBSA's IDEIB support department | • Executive level: Department of treasury, public works and innovation.  
  • Management level: Information technology and telecommunication service  
  • Operational level: Territorial Information Service | • Executive level: Department of land planning  
  • Management level: Department of land planning  
  • Operational level: Technical cartographic group |
| **SDI initiation year** | 2007     | 2008        | 2008       |
| **Technical support** | Administration of the Government of the Balearic Islands | No one | To municipalities |
| **GII stage** | “Internetwork” | Intermediary | Exchange |
| **Funding in Euros** | 150.000  | 20.000      | No response |
| **Number of staff** | 3        | 2           | 2          |
| **Level of support of the SDI in the organisation** | Good support: resources available, political awareness of the importance of the SDI | Lack of support: not enough resources available, lack of political awareness of the importance of the SDI, GIS not integrated into the decision-making culture, not perceiving data as corporate resources | Lack of support: not enough resources available, lack of political awareness of the importance of the SDI, GIS not integrated into the decision-making culture, not perceiving data as corporate resources |
| **Functions** | SDI manager, System support and User support | SDI manager, System support, Database support, User support, production | SDI manager and System support |
| **Partnerships** | Councils, University, Land Registry, municipalities of Mallorca | Six organisations | Council of Menorca and Mallorca, Government of the Balearic Islands |
| **Most important benefits of establishing data sharing partnerships** | • Better decision making  
  • Less duplication of effort and resources  
  • Cost savings | • Better decision making | |
<table>
<thead>
<tr>
<th>Level of collaboration with organisations (poor and very good)</th>
<th>Single authoritative source of data</th>
<th>Poor collaboration with town halls.</th>
<th>Poor collaboration with educational institutions and non-government organisations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor collaboration with non government organisations</td>
<td>Very good collaboration with: provincial/island councils, autonomous community organisations and educational institutions</td>
<td>Very good collaboration with provincial or island councils</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Data quality assessment</th>
<th>Positional accuracy and exactitude accuracy</th>
<th>Logical consistency and integrity of objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Information layers can't be included in INSPIRE themes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>WMS</th>
<th>17</th>
<th>7</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>WFS</td>
<td>No</td>
<td>4</td>
<td>No</td>
</tr>
</tbody>
</table>

| Metadata and catalogue creation date |
|---|---|---|
| 2009 | 2010 | 2008 (not official metadata) |

<table>
<thead>
<tr>
<th>Number of metadata</th>
</tr>
</thead>
<tbody>
<tr>
<td>7,387</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Most problematic ware</th>
</tr>
</thead>
<tbody>
<tr>
<td>Infoware</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Aspects that limited the expansion of the SDIs</th>
<th>Lack of strategy</th>
<th>Technology and data problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inadequate resources</td>
<td>Insufficient awareness</td>
<td>Poor perception and lack of commitment</td>
</tr>
<tr>
<td>Poor perception and lack of commitment</td>
<td>Inadequate IT and GIS skills</td>
<td>Technology and data problems</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Specific aspects that limited the expansion of the SDIs</th>
<th>Insufficient staff number to implement and operate GIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>GIS not integrated into the decision-making culture</td>
<td>Not perceiving data as corporate resource</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Common Strengths that impact on the Balearic Islands SDI development</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enable value adding services</td>
</tr>
<tr>
<td>Existing Geoportal and view service</td>
</tr>
<tr>
<td>Great level of openness with data services (WMS) processes to assess SDI usage and User satisfaction service performance</td>
</tr>
</tbody>
</table>
7.7 Ideal triangular organisation structure of the Balearic Islands case studies

Although there are partnerships between the SDIs of the Balearic Islands, it seems that each SDI node of the islands works independently. A reason could be that the Balearic Islands SDI nodes, first, want to have a formalized well structured SDI before undertaking further relationships. The ideal situation of the Balearic Islands would be with the Directorate General of land zoning (DGTO) at the executive level. And the IDEIB, the IDEmallorca, the IDEmenorca and the CCC, ideally, would be at the management level followed by the municipalities at the operational level.

![Figure 17: Ideal triangular organisational structure of the Balearic Islands SDIs](image)

7.8 Reflection on the survey responses and documentation

The documentation, about the Balearic Islands case studies, provides from the geoportals of the IDEIB, the IDEmallorca and the IDEmenorca and from the survey results. Only for the IDEIB another document was available - IDE (Infraestructura de Dades Espacials) del Govern de les Illes Balears: Definició i planificació (IDEIB, 2008). Due to this limited amount of documentation available, the survey responses were vital for having knowledge of the current situation of the Balearic Islands SDIs.

From the responses it is clear that the IDEmallorca and the IDEmenorca follow a similar triangular organisational structure. On the other hand, the IDEIB follows a similar triangular pattern to the IDEC. All the Balearic Islands SDI case studies have less than four years of life and are working towards the network stage. Even though according to the survey the IDEIB and the IDEmallorca are at the network stage, after the literature review and for this research other stages were considered more appropriate - "internetwork" for the IDEIB and intermediary for the IDEmallorca (see 7.3.4 and 7.4.4). According to the survey the IDEIB...
seems the most developed of the Balearic Islands case studies. Further, the IDEmallorca and
the IDEmenorca are in an underprivileged situation compared to the IDEIB because of the
lack of support of their organisations to the SDI and the insufficient staff number to operate
and implement the GIS and SDI (see 7.6). One of the consequences of the IDEmallorca’s and
the IDEmenorca’s situation is the lack of official metadata. However, both SDIs have the
metadata creation as the top priority.

See the comparative and analysis between the case studies in chapter 9.
8 Catalonia’s SDI organisational context

8.1 Introduction

Catalonia’s administration is under the Generalitat of Catalunya. IDEC’s responsibility is to be a platform for the interchange and sharing of spatial information through Internet. Proof of the solidness of the IDEC is that it received a SDI best practice 2009 eSDI-Net+ award. The SDI of Catalonia was the first fully developed regional SDI in Spain (EC-INSPIRE, 2007, p.16).

Chapter 8, deals with the Catalan SDI case study (figure 18). First the chapter describes the institutional structure of Catalonia’s administration. The structure of the chapter is the same as the Balearic Islands case study chapter divided in: roles, responsibilities and organisational initiatives; triangle organisation structure; organisational aspects; Maturity matrix and SWOT analysis. To end there are other two subchapters: experiences and development of the IDEC and benefits of the IDEC.

8.2 Institutional structure of Catalonia’s administration

Article 5, of Catalonia’s Statute of Autonomy states that “the Generalitat of Catalonia shall structure its territorial organisation into municipalities and comarques (counties)”. Metropolitan bodies are also recognized as local organisations (Van Loenen, 2007, p.80). However, Barcelona’s provincial council is a local government institution that promotes the progress and welfare of the public within its territorial boundaries: the province of Barcelona, a network of 311 municipalities, works directly by providing services and, above all, by cooperating with the councils (diba.es).

8.3 IDEC roles, responsibilities and organisational initiatives

The IDEC SDI-Node has the region of Catalonia as a scope, with an extension of 32.113 Km2, a population of 7.346 habitants and a density of 228, 6 hab/km2 (INE 2008). The responsibilities of the IDEC are to be a platform for the interchange and sharing of spatial information through Internet involving all public administrations as the Generalitat de Catalunya (Catalan Government), the Spanish Government, local entities and other public and private institutions of Catalonia. Also, the responsibility of IDEC is to secure that users have access to the existing geospatial datasets for operating and downloading them. This responsibility consists on making the knowledge of available public administration information be widespread and promoting its use in public and private sectors (IDEC.es). Thereafter, the roles of the IDEC are: public information dissemination, link from IDEE to IDEC, SDI autonomous community node, participant in the IDEE and support of the IDEC Local initiative.

The IDEC is the Catalan autonomous government SDI node. The development of the IDEC is coordinated by a centre of support which is a unit of the Cartographic Institute of Catalonia (ICC). The centre of support reports to the ICC Director and to the Cartographic
Coordination Commission. A part of the functions established by the law, the centre of support (ICC) maintains and promotes formal agreements with other departments and public bodies, as the electronic government organisation, the Information Society Secretary, and others (Craglia, 2009, p.36).

8.4 IDEC triangle organisation structure

IDEC executive level

The Cartographic Institute of Catalonia (ICC- Institut Cartogràfic de Catalunya) is the executive, management and operational body of the IDEC (figure 16). The ICC is an agency of the Generalitat de Catalunya.

The mission of the ICC is to conduct the official cartographic services of general interest for the Generalitat de Catalunya. But also the ICC carries out studies and works assigned by any other public or private entity (Grau, 1998).

In the exercise of the powers of the Generalitat on geodesy and cartography, correspond to the ICC to:

- Establish, manage, maintain and improve the physical infrastructure and technology systems needed to build and manage the Integrated Geodetic Positioning System of Catalonia and the maintenance of topographic databases that support them.
- Conduct aerial coverage of the metric image of the territory of Catalonia (passive and active sensors).
- Establish and maintain databases and cartographic map series.
- Co-operate with the organs of state administration with powers of cartographic nature.
- Lead and manage the Map Library of Catalonia.
- Create, organise, disseminate and maintain the IDEC. And collaborate with the other entities of the Generalitat.
- Prepare studies, issue reports or make suggestions on the ICC field of performance.
- Publish and disseminate cartographic products.
- Organise, conduct, direct, Supervise and develop programs of research, innovation, scientific and technical training in areas of its performance.
- Promote the public and private cartographic services, and research, teaching and technological development in the cartographic field (ICC.es).

The ICC provides the IDEC Project with the facilities and installations for the location of the working team, and the I.T and communication equipment needed for the development of the project. Also, it provides the metadata databases to incorporate them to the Query servers, according to the application of European standards, and ensures the permanent availability and constant updating of this information. Also, it integrates the metadata databases with the ones existing in other departments and entities of the Generalitat. For instance, IDESCAT or SIAL, come from the interconnection of the servers through the network and is able to develop a specific portal of access to all the geographic bases of metadata (gencat.es).

IDEC management level

The ICC, also, takes over the management level together with the Cartographic Coordination Commission of Catalonia (CCC) (figure 16). The Cartographic Coordination Commission of Catalonia is the new basic body of the coordination and collaboration between the regional administration and the local entities in the area of cartography and related geographic

**IDEA operational level**

The centre of support (figure 19) reports to the ICC Director and to the CCC. A part of the functions established by the law, the centre of support (ICC) maintains and promotes formal agreements with other departments and public bodies, as the electronic government organisation, the Information Society Secretary, and others. The staff of the support centre includes 1 Director, 2 programmers, 1 project manager, while technical resources including office space, hardware, software, and services are provided by ICC (Craglia, 2009, p.36).

![Figure 19: IDEC triangular organisation structure](image)

**8.5 IDEC Organisational aspects**

**Orgware**

The head of the IDEC support department rates the level of support that the SDI receives within the organisation as good. Beside, the head of the IDEC support department considers a white book of the GIS sector for the Balearic Islands as unnecessary.

The preferred hierarchical approach for the IDEC, according to the survey, is top-down. Therefore, recognising, the need of standardisation and uniformity is important for this SDI node.

The head of the IDEC support department considers that the IDEC is at the network GII development stage (see subchapter 8.6).

According to the research survey the IDEC gives support to many municipalities and county councils (aprox. 400) that use the IDEC resources and specific applications within the framework of the IDEC. LOCAL initiative promoted by the AOC Consortium (Open Administration of Catalonia), using various tools Departments Platform Resources Geoinformation (PRG), and various agencies (STIS, Tourism, Localret,...).

An important finding of the survey is that the orgware is considered to be the geoware that presents more obstacles in the IDEC.
For the head of the IDEC support department Gilfoyle’s (2004) general constraint that limit the expansion of the IDEC are: insufficient awareness, poor perception and lack of commitment. Then, Gilfoyle’s (2004) following three specific constraints, also, limit IDEC’s expansion: insufficient staff numbers to implement and operate GIS (inadequate resources general constraint); GIS is not integrated into the culture of decision making (lack of strategy general constraint); departmental barriers to effective communication (inadequate GIS and IT skills general constraint).

**Humanware**

**People and users**

In the IDEC the GIS staff is different from the SDI staff, according to the survey. There are 13 employees in the GIS unit and 3 SDI permanent employees. Most employees have postgraduate academic qualifications. The staff within the ICC support centre regularly has the opportunity to update their skills through seminars, conferences, short courses or formal education.

The head of the IDEC support department affirmed that in the IDEC support centre the covered functions are: SDI manager, system support, database support, user support and production.

As found out in the survey the IDEC geoportal isn’t based on a user’s requirement analysis. Moreover, there are procedures to assess the IDEC geoportal usage and the user’s satisfaction, according to the head of the IDEC support department. Also, there are service performance measurements, as stated by the head of the IDEC support department.

**Partnerships and relationships**

In reference to public-private partnerships currently, the IDEC project has active support of 70 partnerships, divided between the public and private sector. These partners include city councils, GI-sector companies, departments of the Generalitat and other bodies (EC-INSPIRE, 2007, p.46). The IDEC maintains informal agreements, according to the head of the IDEC support department, with the AOC Consortium, Localret, Civil Protection, Palau-Rubert (tourism) Universities of Catalonia, CREAT, CCC, GIS companies, Province of Barcelona ...

The level of the IDEC’s collaboration with administrative levels assessed in the survey ranges from poor to very good. The head of the IDEC support department rated the level of collaboration according to his knowledge. The level of collaborations of the IDEC with the town halls is very good. Besides, the level of cooperation of the IDEC with the provincial or island council is good. Further, the IDEC has a moderate level of collaborations with organisations of the autonomous communities. Then, the collaborations of the IDEC with the state are poor. Additionally, the IDEC has a good collaborating level with the educational institutions. Last, the IDEC has a moderate cooperation level with the non-governmental organisations.

The most common duration of collaborations of the IDEC with other organisations, according to the survey, is long term and permanent. Besides, in general IDEC’s partnerships for sharing data and resources resulted in a major benefit to the other organisation, according to the head of the IDEC support department.

For the IDEC the most important benefits of establishing data sharing partnerships, according to the survey, are the cost savings, improved service to rate payers and better
decision making. Likewise, the improved quality of data and the less duplication of effort and resources are important for the IDEC, according to the head of the IDEC support department. Finally, the single authoritative source of data and the reduced request of data by other authorities aren’t important for the IDEC, as stated in the survey.

**Infoware**

The main data providers of the IDEC, according to the head of the IDEC support department, are the ICC, the environment and town councils. Additionally, the accompanying data documents of each of the providers metadata is in Catalan, Spanish and English. Particularly, the geographical names are in Catalan. Therefore, the bilingual need of having to provide information in Spanish and Catalan isn’t a problem for the IDEC.

IDEC has 6,361 Information layers that can be included in INSPIRE themes and 18,461 topography and orthophoto data. Besides, the IDEC has a total of 314 geographic services on its catalogue. The types of services are 296 WMS, 8 WFS, 0 WCS, 1 WPS and 9 WS-I-SOAP. The WMS themes covered are mostly: planning/urbanism, habitats, street map, topography, orthophoto, cadaster, services/equipments, administrative divisions and functional delimitations. Thereafter, the WFS topics covered are: Urban planning, topography, IDEE, hydrology, NATURA 2000 and PEIN.

The ICC has created and published metadata, according to the survey. The creation of metadata started in 2003. Proof of this is that there’s a metadata catalogue counting with 30,000 metadata. The metadata standards adopted are 19115-19139 ISO, ISO 19119. And, there are 150 organisations that provide data to the IDEC. Furthermore, there are 100,000 registries of datasets.

In the IDEC, according to the head of the IDEC support department, there’s no quality assessment.

According to the survey the IDEC rates as very important obstacles for a SDI organisation: data exchange the scattered data without control within and between organisations, SDI without standards and time and effort required to establish agreements. Then, the head of the IDEC support department rates as important obstacles for a SDI organisation’s data exchange the following issues: poorly documented data, lack of confidence or goodwill, management or lack of political support, find and access to appropriate data and communication of information technology and network infrastructure.

**Legal and funding framework**

IDEC, according to the head of the IDEC support department, was born at the end of 2001, as a result of an agreement between the STSI and the ICC driven by the Catalan section of AESIG (today, the Catalan Association of Technology IG - ACTIG). At that time there was no specific law on the subject. In December 2005, the law 16/2005 of the Parliament of Catalonia created the IDEC and its Support Centre, the latter as a unit of the ICC.

The Cartographic Coordination Commission of Catalonia (CCCC) is created to coordinate collaborations among regional and local administrations, and give advice to the Government. The same law (art. 44) establishes the Catalan SDI based on the principles of no duplication, accessibility and sharing of geo-information (reference data, core thematic data and other data of importance for territorial management) according to interoperability standard (Craglia, 2009, p.35).
The IDEC budget, according to the survey, comes from the Department of Public Works, through the framework of the quatrienal agreement with the ICC. The annual budget is of 350,000 Euros, according to the head of the IDEC support department.

### 8.6 IDEC Maturity matrix

According to the head of the IDEC support department the IDEC is in the network stage of the maturity matrix (table 12). This implies that there are few organisational bottlenecks and the change process is driven by innovative motives. The GII has become a network organisation with equal players, a clear vision which operates pro-actively (Van Kerkhoff et al., 1999 cited in Van Loenen, 2006, p.51).

Also a survey question served to find out the most important aspects for the IDEC at the network stage. In first place come leadership and vision as the most important aspect of the network GII stage for the IDEC. According to literature, the vision should be created and supported by all, and frequently reviewed. Furthermore, there's a great awareness of the importance of coordination and the leadership aspect is respected by all stakeholders. In second place, for the IDEC come communication and self-organisation. Literature points out that open communication channels should be strived for, enabling everyone to express their thoughts, opinions, and to actively participate in the decision making process. Finally, with the self-organisation ability there are innovative solutions without thinking of problems and solutions, but offering actively better and new user-friendly services.

<table>
<thead>
<tr>
<th>Aspect/stage</th>
<th>Network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vision</td>
<td>Commonly shared, and frequently reviewed</td>
</tr>
<tr>
<td>Leadership</td>
<td>Respected by all stakeholders</td>
</tr>
<tr>
<td>Communication</td>
<td>Open and interactive between all</td>
</tr>
<tr>
<td>Self-organising</td>
<td>Actively working on innovation</td>
</tr>
</tbody>
</table>

Table 12: IDEC maturity matrix according to the survey response

### 8.7 IDEC SWOT analysis

A SWOT analysis audits the IDEC and its environment. SWOT is a way to find resources and capabilities available in the IDEC for the competitive environment in which it operates. The analysis has been done having into consideration the relevant eSDI-Net+ indicator weighting, the research literature and the survey findings of the IDEC.

<table>
<thead>
<tr>
<th>IDEC SWOT analysis</th>
<th>Weaknesses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Strengths</strong></td>
<td>- IDEC eSDI-Net+ best practice winner in 2009</td>
</tr>
<tr>
<td></td>
<td>- 100,000 registries of data sets</td>
</tr>
<tr>
<td></td>
<td>- Information layers that can be included in INSPIRE themes</td>
</tr>
<tr>
<td></td>
<td>- Information layers provided with a visualization service (WMS)</td>
</tr>
<tr>
<td></td>
<td>- Information layers provided with a download service (WFS)</td>
</tr>
<tr>
<td></td>
<td>- Information provided with standard metadata (19115-19139 ISO, ISO 19119)</td>
</tr>
<tr>
<td></td>
<td>- Enablement of value adding</td>
</tr>
<tr>
<td><strong>Weaknesses</strong></td>
<td>- IDEC not based on a user requirement analysis</td>
</tr>
<tr>
<td></td>
<td>- Orgware is the ware with most obstacles</td>
</tr>
<tr>
<td></td>
<td>- Insufficient staff numbers to implement and operate GIS (only 3 permanent SDI employees)</td>
</tr>
<tr>
<td></td>
<td>- Unmotivated personal</td>
</tr>
<tr>
<td></td>
<td>- IDEC, in the partnership, has less benefits than the other organisation</td>
</tr>
</tbody>
</table>
services (spatial analysis, cartography etc)
- Existing Geoportal facility
- Discovery service
- Metadata catalogue
- View service
- ICC is a strong leading party developing the IDEC
- IDEC has local authority partners
- IDEC has other public body partners
- IDEC has partners from the private sector
- User’s training organised and/or offered
- Existence of a socio-economic impact analysis
- Specific SDI budget
- Legal status of the ICC developing the IDEC
- IDEC deals with legal aspects (public sector information-PSI)
- All languages relevant for the IDEC covered
- IDEC is also in a foreign language (English)
- Great level of openness of the IDEC with its data services (specially WFS)
- IDEC targeted at public sectors, private sectors, universities and citizens
- Procedures to assess SDI usage and user satisfaction
- Service performance measurement
- Good support of the IDEC by the organisation
- IDEC at the network stage of GII development
- IDEC has SDI Manager, System support, database support, user support and production functions
- 300.000 metadata in the catalogue
- Time series are available for orthophotos at the IDEC

<table>
<thead>
<tr>
<th>Opportunities</th>
<th>Threats</th>
</tr>
</thead>
<tbody>
<tr>
<td>• IDEC targeted at the public</td>
<td>• Poor collaboration with the state</td>
</tr>
</tbody>
</table>
Table 13: IDEC SWOT analysis

<table>
<thead>
<tr>
<th>sector and private sector, universities and citizens</th>
<th>government departments or agencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Many and long term partnerships</td>
<td>• Personal confused by initiatives that appear similar to the IDEC</td>
</tr>
</tbody>
</table>

8.8 Experiences and developments of the IDEC

In the following lines there are the experiences learnt by the IDEC during the SDI implementation. The experiences are divided in four themes:

- general literature “how to” aspects;
- local and sectorial consideration;
- organisational aspects and
- economical aspects.

Theme 1: IDEC “how to” aspects

1. Learn from other experiences
Guimet (2003) stated “we have learnt from other experiences, and we have considered some organisational models applied to other European regions”

A summary of Guimet’s (2003) conditions which contribute to the management of the IDEC project is as follows:

- Obtain a maximum participation of suppliers, companies, technicians, and users in the social, economic and institutional agents.
- Achieve institutional collaborations (led by the Administration).
- Make results approach applied and oriented to the end-user, short-term projects and concrete applications...
- Assure non-permanent financial resources for the SDI maintenance and its self-financing future development, to launch the project.
- Give initial support, even with human resources, on Metadata implementation in organisations and companies that have collaborated.
- Convince people introducing the SDI project of its importance and purposes, to reduce the reluctances to give their own information that sometimes can appear.

Theme 2: Local and sectorial aspects

2. Sectorial approach of the IDEC
From the beginning, IDEC adopted the initiative of creating thematic SDIs, as far as possible, more adapted to the specific needs of specific domains. Each thematic SDI has its own geoportal and services, being part of the Catalan SDI resources (Guimet, 2006, p.2).

IDEC’s strategy is based on a sectorial construction of specialised SDI’s. That’s to say, instead of promoting a servers’ catalogue, IDEC constructs sectorial finished products combining map servers with information capable of being integrated in the specialised domain of each mentioned SDI. This thematic development approach has been used instead of the traditional sense of providing the basis for all kinds of themes. Therefore, the end-user searches the sectorial SDI’s Catalogue and selects the SDI according to its requirements obtaining the preselected data set in the corresponding servers (Guimet, 2004, p.129).
Especially interesting is the project "IDEC Local", sponsored by the Open Administration of Catalunya (AOC), an entity formed by the consortium of counties and the Department Localret Governance and Public Administration of the Catalan administration. Also in this respect, the Coast Management SDI (Eurosion Project) and SDI Univers (inter-universities, in construction) have been developed and it is foreseen to develop different SDI’s: provincial, metropolitan, real state, energetic, communication networks, etc. In the present context, sectorial SDI’s offer better and more coherent services to end users that can be compatible with a total "open" configuration (Guimet, 2004, p.129).

3. Importance and encouraging of local entities
IDEC LOCAL encourages local authorities to document their information resources with metadata, publish this information in catalogues and enable access and sharing through web services (Gragliia, 2008, p.18). Local authorities represent a very important user group because apart from internal purposes, they also use IDEC resources to offer new and improved information services to their citizens (Craglia, 2008, p.20).

The new political framework in Catalan territorial planning includes an important role for local public administrations and other public bodies responsible for urban development. The availability of territorial information; corporate transparency; intercommunication among different players; democratisation; and public participation are among the values demanded of the new policies and provided by IDEC (Craglia, 2008, p.48).

Theme 3: Organisational aspects

4. Partnerships
As already mentioned above, in subchapter 8.9.4, in reference to public-private partnerships currently, the IDEC project has active support of 70 partnerships, divided between the public and private sector.

In respect to the contribution of the IDEC to increased data sharing across departments, 25% of the respondents of the GIS market survey indicated a significant contribution, 40% some contribution, and the remaining 35% no contribution. This finding is interesting in that it reflects the difficulty to introduce tools and processes in local contexts which are often quite reluctant to change, particularly when it comes to sharing information. The IDEC is clearly making a contribution, but the process is long (Craglia, 2008, p.20).

5. Raise awareness on benefits of the IDEC
To raise awareness of the applications and benefit of the project, the IDEC organised several workshops. Also, it participated heavily in the annual GIS FORUM on new technologies, and published and distributed several brochures on the meaning, goals and impacts of SDIs (Craglia, 2008, p.12).

6. Good support of the IDEC in the organisation
The answer of the research survey question about the level of support of the IDEC in the organisation was that the IDEC has good support. The support from the organisation is an important factor that has an important paper in the success of the SDI initiative.

7. Aspects that have limited the expansion of the IDEC
One of the multiple option questions of the research survey was aspects that limit the expansion of the IDEC initiative. Gilfoyle’s (2004) following general constraints were the answer:
- Inadequate resource;
- Insufficient awareness, poor perception and lack of commitment;
- Lack of strategy;
8. Four rules to set up a basic SDI
Guimet (2004b) argues that “the experience obtained during the SDI Project development process, that’s to say, how problems have been approached and overcome and achievements reached, can be summarized in four rules:

- To have a minimum basis of geo-spatial information of reference and goodwill to make it approachable (information approach) (8.1).
- To define accurately the results to be reached, specially end-users applications (business approach) (8.2).
- To manage the process from the engineering point of view: to develop the project combining the existing elements (engineering approach) (8.3).
- To consider and deal with the environment (social an organisational approach) (8.4)” (Guimet, 2004b, p.1).

8.1 Digital information available
Digital information has to exist and be available on line (internet). If information does not exist, the information infrastructure has no sense. Anyhow, a SDI can help to issue and spread new information and promote the existing one. The Institut Cartogràfic de Catalunya (Map Agency of Catalonia) started the policy, in the middle of the year 2003, to put at the public disposal orthophoto and topographic maps, toponymy and other cartographic data (Guimet, 2004b, p.5).

8.2 Focus on end users
End-users objectives and interests have to be scheduled as clear as possible and SDI results will be the objectives achievement (Guimet, 2004b, p.4). An SDI can help to issue and spread new information and promote the existing one, the Institut Cartogràfic de Catalunya (Map Agency of Catalonia) started the policy, in the middle of the year 2003, to put at the public disposal orthophoto and topographic maps, toponymy and other cartographic data (Guimet, 2004b, p.5).

On the esdinetplus.eu webpage, it's stated that the IDEC has been selected best practice with respect to its strong user involvement. The main objectives of this SDI were to facilitate the use of geographic information and to motivate all kinds of users. As a result of IDEC's activities, more than half the municipalities in the region are actively making use of geographic information in their work and private sector users account for forty per cent of all usage (esdinetplus.eu).

GIS market survey
A survey of the real technologies situation and geospatial information systems (TIG/SIG) in the Public Administration of Catalonia has allowed to have an inventory document with conclusions and proposals for strategies and policies in public services (Guimet, 2004, p.4). This GIS market survey in Catalonia was made in collaboration with several Catalan Universities and the AESIG Catalan Section (Guimet, 2003, p.4). To evaluate the benefits of the IDEC, this study focused on two main groups of users: institutional users and value-added private sector companies using the main IDEC services, and local authorities using the IDEC LOCAL applications (Craglia, 2008, p.24). In 2006, the Catalan division of AESIG (AESIG-CAT, in Catalan) began the study on the GIS sector in Catalonia (both public and private). Its objectives were:

- To quantify changes in the sector;
- To assess the job market for GI technicians and evaluate GIS education;
- To study market trends for products and technologies;
- To compare the current situation with that found in a study performed in 2002;
• To analyse the impact of new regulations on the sector, as well as new active elements (e.g. Google, Microsoft Live and SDIs) (Craglia, 2008, p.21).

The AESIG end-users survey is taken via the Association website and draws on the collaboration of professional organisations. The aim of the survey is to collect information on how online GIS applications for end-users are used (e.g. Google and IDEC); predict future trends; and determine the opinion of end-users on services offered by IDEC (e.g. the Catalogue and the Client) or by other institutional providers, specially the ICC.

8.3 System engineering point of view
Engineering is the application “know how” to practical results by means of projects (Guimet, 2003, p.6). The following aspects have to be considered for the SDI projects:
• SDI project requires objectives, resources and time;
• SDI objectives have to be clear;
• Technological resources exist and operate correctly with a relative low cost;
• Development and success of SDI depends on organisation as well as policy, legal framework, institutional culture, socio-economic framework and other elements more than technology, and implies a higher cost (Guimet, 2003, p.7).

In a system engineering approach different elements need to be combined and managed together (figure 20), like: Map Agency + E-GOVERN + SECTOR, METADATA, CATALOG, INTEROPERABILITY, GEOPORTAL, SERVICES sector support, social marketing, legal framework and Internal analysis (Guimet, 2003, p.6).

8.4 Consider project environment
Guimet (2004b) stated that “the project environment has to be considered before, during and after the process”. To follow this consideration it is necessary to face troubles and show information and make it accessible to end-users. Also, Guimet (2004b) argued that it is necessary to counter-argument some usual reasons that justify the non public accessibility of the data. Because, if information is not shown it will never be improved and politics will be pressed so that information can be improved. Further, Guimet (2004b) affirmed that it is important that the initial framework of support to the project: arises from more than one department; act as a wholesaler granting the configuration of the own SDI to other entities and convince and train before ruling (Guimet, 2004b, p.7).
Theme 4: Economical aspects

9. eGovernment funding of the IDEC

eGovernment funding by the Catalan government (Generalitat) has supported the development of the IDEC directly but also through almost €1.5 million made available to local government for GI projects linked to the development of the IDEC such as creation of metadata and geo services (Craglia, 2008, p.24). Specifically, IDEC Local is supported by regional eGovernment funds that give incentives for the creation of metadata (30 € per metadata record), the publication of data in OGC-compliant services (€2,000 subsidy to each participating authority), and also support GIS projects closely related with the IDEC (Craglia, 2008, p.12).

8.9 BENEFITS OF THE IDEC

In the following lines the benefits of the IDEC are enumerated.

1. Benefits of encouraging local entities

By the end of 2006, i.e. less than one year of operation, the IDEC Local project had achieved the following results:

- 80 local authorities were using the viewers integrated in their web pages;
- Online Municipal Street Maps were registering 15,000 monthly visitors;
- 20 local authorities were using publication tools and were publishing new layers;
- 25 municipalities had their WMS (4 to 6 layers) connected to the IDEC Local network;
- 60 municipalities had published their geodata metadata in the Catalogue service (3,000 new records);
- New projects using WFS transaction technology were being planned (Craglia, 2008, p.20).

2. Benefits of eGovernment funding

eGovernment funding of the IDEC by the Catalan government has raised awareness with public administration of the opportunities offered by GI to support the delivery and planning of services and has reduced the digital divide between large organisations and the small and medium-sized municipalities, who normally lack the financial and human resources to undertake GI technology projects (Craglia, 2008, p.20).

Among the most important of the socio-political implications is that implementation of the IDEC services at local entities in rural zones has helped reduce the digital gap between these often small municipalities and much larger ones. Also noteworthy are the effects that some of these services have had on interactions between administrations and citizens (Craglia, 2008, p.20).

3. Time saving

Within the quantifiable economic benefits the key element of the IDEC is time saved in responding to information requests related to land use planning, cadastre, building permissions, environmental issues, tourist information and so on. These requests are either internal to the organisation, or are coming from citizens and companies, and require an articulated information flow across more than one department to be answered (Craglia, 2008, p.31).

Five different types of savings were identified within the quantifiable economic benefits of the IDEC: internal queries executed by civil servants; internal processes; serving the public; by citizens; by companies (Craglia, 2008, p.43).
4. Distribution of territorial knowledge
Craglia (2008) commented on the realization of the potential of the IDEC the following words: “In the future, once the potential of the IDEC has truly been realized (i.e. expanding to more municipalities, providing more and better information) it will be of notable importance to the distribution of territorial knowledge. This is critical for effective communication between the public (e.g. social organisations, professionals and public agents) and local institutions. This dialogue will provide citizens with a new role in territorial politics, making it more transparent, more participative and better suited to the needs of society” (Craglia, 2008, p.43).

5. Total investment of the IDEC paid back in 6 months
The total investment for the IDEC (and not just for the IDEC Local that represent only some 40% of the operations) over the period 2002-05 has been recovered in just over 6 months, considering only the benefit internal to local administrations, and only for 2006. Therefore any benefit that may have accrued in other users of the IDEC has not been considered, nor any additional benefit that may have accrued during 2004-05 (Craglia, 2008, p.45).

6. Organisation interested in publishing information in the IDEC
Many public organisations are now interested in publishing their geodata and making it available through the IDEC network. Also, some private companies have expressed their interest in being listed in the IDEC metadata Catalogue server, and in providing access to some layers as well, since this could be a good way for them to advertise their products and services. These facts suggest that the IDEC will play an important role in the future in education and training and the development of a geographically more conscious culture (Craglia, 2008, p.48).

7. Benefits of data sharing for the IDEC in data sharing
In the research survey, the head of the IDEC support department rated as very important benefits of the IDEC the following data sharing aspects: cost saving, improved service to rate payers and better decision making. Thereafter, improved quality of data and less duplication of effort and resources were rated as important factors for the IDEC data sharing benefits, according to the head of the IDEC support department.

8. Capital savings
Capital savings can be divided into savings in consumables and in IT investment. Within the socio-economic GIS market survey in respect to the former, 60% of the authorities indicated perceived savings in consumables, such as paper and ink in map production now that the maps are available on line. In some cases, they were very definite about the savings reporting for example:

“Due to the IDEC tools we are saving the 50% of material, we have grown in sustainability”
In respect to savings in IT, just over half of the authorities indicated that they had planned to Invest in a web viewer for geospatial data prior to the introduction of the IDEC Local project. As a result of this project, they were able to obtain the viewer at no cost, and thus save capital investment (Craglia, 2008, p.35).

9. Departmental use of the IDEC
All the departments analysed in the GIS marker survey were keen users of the tools made available through the IDEC and the IDEC Local, particularly in the Mapping/GIS department as expected, and Tourism, to respond to local queries by tourists (Craglia, 2008, p.35).
8.10 Reflection on the survey responses and documentation

The documentation used for the IDEC are aspects from Craglia’s (2009) advanced regional SDI in Europe JRC scientific and technical report, the EC-INSPIRE SDI in Spain: State of play 2007, information from the IDEC Geoportal and the IDEC 2010 research survey done for this thesis. IDEC is very well documented compared to the Balearic Islands case studies.

From the survey responses and literature it seems like IDEC has a strong organisational structure, composed by the ICC and CCC, that give support to many Catalaan municipalities (see 8.5). The combination of IDEC’s nine years of existence and its experiences and developments (see subchapters 8.8 and 8.9) make it a good example to follow for the Balearic Islands case studies. However, the IDEC still has a few bottlenecks to solve like: insufficient staff, unmotivated personal and orgware as the ware with more obstacles. Therefore, even though IDEC is considered to be in the network stage, due to the constant evolution of SDIs and the uncertainty, it could change in any moment. Further, the fact that the ICC doesn’t depend, at the executive level, on any Catalan government department could be discussed to see if it is beneficial or detrimental for Catalonia’s SDI.

See the comparative and analysis between the case studies in chapter 9.
Part 5
Thesis research evaluation: discussions and results
9 Discussions

This chapter presents the most important findings of the organisational aspect of the case studies.

9.1 Organisational aspects of Catalonia’s and the Balearic Islands’ SDIs

The interpretative case studies of this research attempt to understand the organisational aspects by assessing the meaning that the heads of the case studies SDI departments assign to them. The three following reasons are why a case study is a viable information systems research strategy for this thesis: 1. Learn about the state of the art, and generate theories from practice of the Catalan and Balearic SDI nodes; 2. Answer "how" and "why" questions, to understand the nature and complexity of the SDI initiatives processes taking place in the Catalan and Balearic organisations; 3. Appropriate way to research the area of sub-national SDIs in the Balearic Islands in which few previous studies have been carried out. And it is an appropriate way to research the autonomous community level in Catalonia.

The main research question - From what organisational experiences and developments could the Balearic Islands’ SDIs benefit from Catalonia’s SDI? - is a challenging question in quite a fundamental way. The question is non-trivial. It could be said: the Balearic case can benefit from all the experiences and developments of the Catalan SDI. Although, there is also the danger of just copying the Catalan SDI case. The uniqueness of the Balearic SDI context is therefore recognised during all the research. Further, relating the experiences of one case leads to dilemmas. Therefore, applying experiences and developments of IDEC’s concrete SDI is navigating between dilemmas.

Case studies roles and responsibilities

The responsibility of all the case studies is to make the spatial information accessible for all the users. Additionally, the roles of all the case studies are basically: public information dissemination, link from IDEE to their node and participant in the IDEE.

SDI hierarchy view: top-down and bottom-up

The case studies have differences over the two visions of the SDI hierarchies: top-down and bottom-up. The IDEC and the IDEmallorca prefer a top-down approach (figure 21). Therefore, the IDEC and the IDEmallorca prefer emphasising the need for standardisation. On the other hand, the IDEIB and the IDEmenorca initiatives prefer a bottom-up approach. In other words, the IDEIB and the IDEmenorca prefer to highlight the importance of diversity and heterogeneity given the different aspirations of various stakeholders. The different points of view of the case studies are directly related to the type of situations the case studies confront and the matters they give importance to.
Triangle structure of organisations

There are various similarities and differences between the Catalan and Balearic Islands case studies' triangle organisational structures (table 14). The differences between the IDEC and the rest of the case studies are found in the following fields: executive level, management Cartographic Coordination Commission and the sectorial IDEC Local. The first most notorious difference between the IDEC and the Balearic existing nodes is that the IDEC at the executive level doesn’t depend on any, department of the government like the IDEIB or of any department of the council like the IDEmallorca or the IDEmenorca. Instead the IDEC depends directly of the ICC. Thereafter, the IDEC counts with the CCC at the management level. The IDEIB and the insular council’s nodes don’t have any similar figure to the CCC. The CCC is a basic body of coordination and collaboration between the regional administration and the local entities in the area of cartography and related geographic information. Neither do the Balearic Islands SDI nodes have any sectorial initiative like the IDEC Local. However, the IDEC Local could be seen as an equivalent of the IDEmallorca and the IDEmenorca because of the importance of the local component in all three SDIs. Further, there are many differences: the IDEmallorca and the IDEmenorca aren’t sectorial initiatives of the IDEIB; neither do the council nodes have the technological support of the IDEIB; nor do the executive and management levels of the councils have an eGovernment organisation in charge.

The IDEC and the IDEIB have a similar organisation profile based on their responsibilities. Both, are a SDI node of an autonomous community. Further, both ICC and SITIBSA are the public cartographic organisations of the Catalan and Balearic Islands governments.

The Balearic Islands existing insular council SDI nodes, also follow a similar pattern. Both, the IDEmallorca and the IDEmenorca depend at the executive level of a council’s department. Also, at the operational level both, the councils’ SDIs have a technical group. However, at the management level the IDEmallorca has an intermediate, informatics and telecommunication service that the IDEmenorca doesn’t have. Menorca’s council’s management is in hands of the land planning department. Furthermore, the IDEmallorca has a local consortium of informatics that works in collaboration with the local authorities, with some GI aspects, that the IDEmenorca doesn’t have. However, none of the insular councils have a basic official body of coordination and collaboration between the regional and local entities like the CCC, that is actively involved in Catalonia’s SDI.

<table>
<thead>
<tr>
<th></th>
<th>Executive</th>
<th>Management</th>
<th>Operational</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDEC</td>
<td>ICC</td>
<td>ICC, CCC</td>
<td>IDEC centre of support</td>
</tr>
<tr>
<td>IDEIB</td>
<td>Directorate General of land zoning</td>
<td>SITIBSA’s IDEIB support department</td>
<td>SITIBSA’s IDEIB support department</td>
</tr>
<tr>
<td>IDEmallorca</td>
<td>Department of treasury, public works and innovation.</td>
<td>Information technology and telecommunication service</td>
<td>Territorial Information Service</td>
</tr>
<tr>
<td>IDEmenorca</td>
<td>Department of land planning</td>
<td>Department of land planning</td>
<td>Technical cartographic group</td>
</tr>
</tbody>
</table>

Table 14: Triangular organisational structure
SDI initiation year and technical support

An important factor to consider is that the IDEC (2001) started 6 years before the IDEIB (2007) and 7 years before the IDEmallorca (2008) and the IDEmenorca (2008) (figure 22). Therefore, IDEC by age should have more SDI experience. Anyway, each SDI goes through a series of stages and it is clear that the current stages and forms of a societal organisation of the case studies will certainly change. In other words, the future of the case studies is uncertain. Uncertainty is not just because of lack of information or cognitive ability to anticipate future developments but that these developments are literally hidden in the future and shaped by the possible future acts of others (Crompvoets, 2008, p.36). A major dilemma in designing and implementing socio-technical assemblies like a SDI is the conflict between an uncertain and complex reality and the conflicting views and interpretations that comes with it; and the need for simple decision-making criteria (Crompvoets, 2008, p. 35).

The IDEC and the IDEmenorca give technical support to municipalities. Apart, the IDEC gives technical support to county councils and the IDEmenorca gives support to all the departments of the Council of Menorca. Thereafter, the IDEIB, mainly, gives support to the administration of the Government of the Balearic Islands. On contrary, IDEmallorca doesn’t give technical support to any department or organisation.

The IDEC gives support to the municipalities that use the IDEC resources and specific applications within the framework of the IDEC Local. Nevertheless, there’s no sectorial initiative like IDEC Local for any of the Balearic Islands’ case studies. Further, specially the Councils of Mallorca and Menorca are dealing with lack of support of the organisation, lack of staff and lack of budget. Therefore, it’s believed that the municipalities of the Balearic Islands don’t even get half of the support that the Catalan municipalities have. However, as a first step, IDEIB has signed agreements with all the municipalities of Mallorca. And IDEmenorca was built as an agreement made up with the eight town halls of Menorca. Therefore, probably it’s just a matter of time that the municipalities get more support.

In all the case studies, except the IDEmenorca, that didn’t respond, there are procedures to assess the geoportal usage and the user’s satisfaction. Also, in all the case studies there are service performance measurements. Therefore, this shows that all the case studies are very interested in knowing the number of end-users that have access to the geographic information they provide.

All the Balearic Islands case studies considered that a white book of the GIS sector in the Balearic Islands would be useful. Further, only IDEIB, in the survey, affirmed to use the IDEC as a model.
Stage of GII development

A survey question asked about the stage of GII development of the case studies (figure 23). The IDEC, the IDEIB and the IDEmallorca answered that they were at the network GII stage. However, based on the literature review, for this research the IDEmallorca is considered at the intermediary stage and IDEIB is considered to be at the “internetwork” stage. Specially, the IDEC and IDEIB accomplish their responsibility of making accessible the geographic information with their GII stage. The IDEC at the network stage is the case study with fewer bottlenecks for making the GI accessible. Thereafter, the IDEmallorca and the IDEmenorca mention integrating metadata through the Net and none of them have official metadata. Therefore, both these SDI nodes need to solve all their bottlenecks to arrive at the network stage.

More in detail aspects of the GII stages are described in subchapters 3.5, 7.3.3, 7.4.3 and 7.5.3.

In the survey there was a question about the most important aspects for the case studies at a specific stage (vision, leadership, communication and self-organisation). The idea to know the order of importance of the aspects at a specific GII stage was to overview the priorities that the interviewed people gave for the case studies (figure 24). To sum up, the aspect rated as the first in importance for most case studies was vision, rated by the IDEC and the IDEmenorca. Then, the IDEIB and the IDEmallorca, respectively, rated communication and self-organisation as the most important aspects. The reasons why those aspects were rated, as first in importance, haven’t been queried. However, conclusions can be gathered by the meaning of each of the aspects, described in subchapter 3.5.
Funding

The government of Catalonia funds the IDEC with a budget of 350,000 Euros. And the government of the Balearic Islands funds the IDEIB with a budget of 150,000 Euros. Further, the Council of Mallorca funds the IDEMallorca with a budget of about 20,000 Euros. Conversely, the IDEMenorca doesn’t even figure in Menorca’s Council’s annual budget. The IDEMenorca for the period 2009-2010 has an allocated budget between the Council of Menorca and the Ministry of Industry. Undoubtedly there is a huge financial difference between the case studies (figure 25). The IDEIB receives half of the annual budget of the IDEC. And the IDEMallorca doesn’t even get a quarter of IDECs budget. For instance, these differences can affect the proliferation of the SDIs. Put another way, money is important for growth. The proliferation of SDIs indicates the viability of the concept and must therefore be an important aspect in assessing SDI development. Thus, the IDEC has a big rate of adoption and innovation through social systems. Specifically, IDEC’s characteristics of the innovation and innovatiness and communication channels with the social system have proven to be innovative. This is because of IDEC’s best practice 2009 eSDI-Net+ award, won specially for the user involvement aspect.

Humanware

The IDEC and the IDEIB have 3 permanent SDI employees (figure 26). Moreover, the IDEC has 13 permanent GIS employees and the IDEIB has 4 permanent GIS employees. In contrast, the IDEMallorca and the IDEMenorca have two employees for both GIS and SDI jobs. The IDEMallorca’s employees aren’t permanent and only one employee is permanent for the IDEMenorca. In conclusion, the IDEC and the IDEIB have the advantage of having separate employees for the GIS department and the SDI department that the IDEMallorca and the IDEMenorca don’t have. Also, the IDEC and the IDEIB have the virtue of being the official cartography organisations before the SDI existed. Therefore, obviously all the GIS matters are more developed than in the Councils where the GIS and SDI units developed in parallel.

All case studies have mostly postgraduate employees. In all the case studies the SDI employees have the opportunity to update their skills through seminars, conferences, short courses or formal education.

Regarding the SDI functions (table 15). All the case studies have a SDI manager and a system support function. Thereafter, the IDEC and the IDEMallorca have the system
support, user support and production functions. The IDEIB, also, has the user support function. Support and production wise the IDEC and the IDEmallorca are better prepared than the IDEIB and the IDEmenorca, according to these case studies functions.

<table>
<thead>
<tr>
<th>SDI node functions</th>
<th>IDEC</th>
<th>IDEIB</th>
<th>IDEmallorca</th>
<th>IDEmenorca</th>
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<tbody>
<tr>
<td>System support</td>
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<td>Database support</td>
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<td>User support</td>
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<tr>
<td>Production</td>
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Legend: Existing functions

Table 15: SDI functions according to the respondent survey

Partnerships

The IDEC maintains informal agreements with many organisations, about 70, according to the survey. On the contrary, the IDEIB maintains partnerships with a few public organisations (Councils, University, Land Registry, all municipalities of Mallorca...). On the other hand, the IDEmallorca has partnerships with about six organisations. In contrast, the IDEmenorca by agreements has partnerships with the councils of Menorca, and Mallorca and the government of the Balearic Islands. For instance, an observation of the IDEmenorca in the survey was that as they are at an early stage of SDI implementation agreements with private organisations haven’t been worked on, yet.

A survey question assessed the level of collaborations of the case studies regarding different hierarchical administrative level organisations (table 16). The two extremes “very good” and “poor” are enumerated in the following lines. Why some levels of collaborations are very good and others are poor was out of scope for this thesis. In one extreme, the collaboration levels rated as “very good” are the following ones: the IDEC with town halls, the IDEIB and the IDEmallorca with provincial or island councils and the IDEmallorca with the educational institutions and autonomous community organisations. Furthermore, in the other extreme the levels of collaboration rated as “poor” are the following ones: the IDEmallorca with the town halls; the IDEC and the IDEmenorca with the state; the IDEmenorca with the educational institutions; the IDEIB and the IDEmenorca with non-governmental organisations.

<table>
<thead>
<tr>
<th>Organisation</th>
<th>IDEC</th>
<th>IDEIB</th>
<th>IDEmallorca</th>
<th>IDEmenorca</th>
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<tr>
<td>Town halls</td>
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<td>Provincial or Island Councils</td>
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<td>Autonomous Community organisations</td>
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<tr>
<td>State government departments or agencies</td>
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<td>Educational institutions i.e. Universities</td>
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<td>Non-government organisations</td>
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Legend: Very good Poor

Table 16: Case studies level of collaboration with different organisations according to the respondent survey

The IDEC’s, the IDEIB’s and the IDEmallorca’s most common collaboration duration with other organisations are long term or permanent. On the other hand, the IDEmenorca sets medium term collaborations, up to 3 years. In general the IDECs, the IDEB’s and the IDEmallorca’s partnerships for sharing data and resources resulted in a major benefit to the other organisation. Then, in the IDEmenorca the partnerships resulted in equal benefits for both organisations. Probably this means that the IDEC, the IDEIB and the IDEmallorca give more data to other organisations than the other way round. However, it is out of scope, for this research, to find out the reasons the case studies organisations or the other ones benefit more from data sharing partnerships.
In the survey there was a multiple-answer question about the most important benefits of establishing data sharing partnerships. Only the very important options of more than one case studies’ rating have been analysed. First, three (IDEC, IDEIB and IDEmallorca) out of the four case studies rated better decision making as one of the most important benefits of establishing data sharing partnerships (figure 27). Then, half of the case studies (IDEC and IDEIB) rated less duplication of effort and resources, cost savings and single authoritative source of data as very important aspects.

![Figure 27: Most important benefits of establishing data sharing partnerships according to the respondent survey](image-url)

According to this research there’s no potential impact or relationship of the local, provincial/autonomous community with the state levels. Nonetheless, according to the collaboration levels all case studies have best relations and direct impacts with the

<table>
<thead>
<tr>
<th>Levels of subnational Organisation</th>
<th>Provincial or Island councils (IDEmallorca, IDEmenorca)</th>
<th>Autonomous Community (IDEC, IDEIB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relationships of case studies with sub-national levels</td>
<td>P ➔ T A ➔ T</td>
<td>P ➔ P A ➔ P</td>
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<td></td>
<td>P ➔ A A ➔ A</td>
<td>P ➔ S A ➔ S</td>
</tr>
<tr>
<td></td>
<td>P ➔ E A ➔ E</td>
<td>P ➔ N A ➔ N</td>
</tr>
</tbody>
</table>

T=Town halls; P=Provincial or Island councils; A=Autonomous community; S=State; E=Educational institutions; N=Non government organisations

| Table 17: Relations between the case studies sub-national SDIs according to the respondent survey. Adaptation of relations between different levels of SDIs (Rajabifard, 2000) |

Provincial/council levels and with the autonomous community organisations (table 17). Further, probably the reason of a poor collaboration with the state is because, in this research, the assessment is of the sub-national level and not all the SDI hierarchical levels. Therefore, it’s normal that, out of all relations, the local, provincial and autonomous community have more strength than the state relations. Only provincial or island councils and the autonomous community organisation levels are filled in because they correspond to the case studies’ organisations administration levels.
Infoware

The main data providers of the IDEC are three - ICC, Environment and Town Councils. Thereafter, the IDEIB has two main data providers that are the Government Boards and Councils. The IDEmallorca’s main data providers are the following four: Public Works Department, Department of territory, Department of Environment and Department of Heritage. Finally, the IDEmenorca has two main data providers, the Balearic Government and the Insular Council of Menorca.

All the Balearic Islands’ SDI nodes have a data quality assessment (figure 28). Further, the IDEC doesn’t. The IDEIB’s data quality assessment includes positional and exactitude accuracy. Both the IDEmallorca’s and the IDEmenorca’s data quality assessments includes logical consistency and integrity of objects.

The geographical names of all the case studies are managed in Catalan. The languages of the accompanying data documents for the IDEC are in Catalan, Spanish and English. However, the head of the IDEC support department pointed out in the survey the language isn’t a matter of the IDEC, but of each provider. Thereafter, the IDEIB has data accompanying documents in English, German, Spanish and Catalan. Further, the IDEmallorca and the IDEmenorca provide accompanying data in Catalan. The bilingual need of providing information in Spanish and Catalan isn’t a problem for any of the case studies.

All the case studies, except the IDEmallorca, have metadata and a catalogue published by their organisation. The IDEC started creating and publishing metadata and a catalogue in 2003 (figure 29). Thereafter, IDEIB started creating and publishing metadata and a catalogue in 2009.

The IDEmenorca’s metadata doesn’t follow the official standards. Finally, the IDEmallorca’s objective is to create and publish metadata and a catalogue this year 2010. The reason no metadata was created, before, was for insufficient human resources.
IDEIB has data from 8 organisations. No response was obtained from the IDEmallorca. And the IDEmenorca has data from the council of Menorca and Menorca's town halls.

The IDEC has adopted 19115-19139 and 19119 ISO metadata standards. Then, the IDEIB has the ISO 19139 NEM metadata standard. Further, the IDEmallorca will follow the ISO 1995 metadata standard. The head of Menorca’s cartography technical group in the survey mentioned about the IDEmenorca “we have metadata but it doesn’t meet the standard. We are currently migrating the information to its own profile”.

Regarding the number of metadata of each of the case studies (figure 30), the IDEC has 30.000 metadata. IDEIB counts with 7.387 metadata in four languages. Then, the IDEmenorca has 699 metadata registries. Further, the IDEC has 100.000 registries of datasets and the IDEmenorca has 699 database registries. The IDEIB and the IDEmallorca didn’t give any responses about data registries.

The IDEC has data from 150 organisations. Thereafter, the IDEIB has data from 8 organisations. No response was obtained from the IDEmallorca. And the IDEmenorca has data from the council of Menorca and Menorca’s town halls.

The IDEC has adopted 19115-19139 and 19119 ISO metadata standards. Then, the IDEIB has the ISO 19139 NEM metadata standard. Further, the IDEmallorca will follow the ISO 1995 metadata standard. The head of Menorca’s cartography technical group in the survey mentioned about the IDEmenorca “we have metadata but it doesn't meet the standard. We are currently migrating the information to its own profile”.

The number of WMS of the case studies is as follows: 296 for the IDEC, 17 for the IDEIB, 7 for the IDEmallorca and 10 for the IDEmenorca (figure 31). The Balearic Islands case studies common WMS topics are: Sector Master Plan, Insular Territorial Plans, orthophoto, transport and limits/boundaries (figure 33). IDEC’s WMS (figure 34) themes are mostly: planning/ urbanism, habitats, street map, topography, orthophoto, cadaster, services/equipments, administrative divisions and functional delimitations (figure 34). And on the other hand, the number of WFS is less: 8 for the IDEC and 4 for the IDEmallorca (figure 32). The IDEC’s WFS topics cover the following themes: Urban planning, topography, IDEE, hydrology, NATURA 2000 and PEIN. And the IDEmallorca’s WFS covered topics are: Sector Master Plans (Plans Directors...
Sectorials), interest points, transport and administrative limits.

The ISO themes information is based on the information available on the IDEC’s and the IDEIB’s geoporal catalogues, in January 2010. The IDEIB’s five most numerous layers of ISO themes (figure 35) are by order: transportation; boundaries; environment; elevation; inland waters. The least numerous layers of ISO themes are climatology and geoscientific information. Then, the IDEC’s five most numerous ISO themes (figure 36) are: environment; planning and cadastre; structure; elevation; location. The least numerous IDEC themes are oceans and health.
Aspects that limited the expansion of the case studies

Most problematic ware

Knowing the geoware that presents more problems (figure 37) is an useful indicator that can serve to know what the SDI nodes need to work harder on. Therefore, future strategies of the SDI nodes could be set with specific objectives for the problematic “geoware”. For instance, the orgware is the ware that presents most obstacles for the IDEC and the IDEmallorca. As an illustration, the IDEC and the IDEmallorca probably need to work harder on the plans, preparations, agreements and negotiations arranged around the infoware, technoware and humanware issues. Further, for the IDEIB the infoware is the ware that presents most obstacles. Consequently, it seems like IDEIB has to pay more attention to the accumulated knowledge needed to realize the full potential of the technoware, humanware,
and orgware. In contrast, the IDEmenorca presents more problems with the humanware. Thus, more people or a better organisation might be needed for the people responsible for designing, implementing and using the IDEmenorca.

Aspects that limited the expansion of the SDI initiative

The most limiting general constraint for the SDI expansion of all the case studies (figure 38), out of the list of Gilfoyle’s (2004) constraints, is the lack of strategy. Then, three of the case studies (IDEC, IDEmallorca and IDEmenorca) see the inadequate resource of an insufficient staff numbers to implement and operate GIS as the specific most limiting GIS constraint for the case studies SDI (figure 39). Further, an interesting result is that all the Balearic Islands’ case studies agree that they suffer from the general GIS constraint of technology and data problems. The IDEmallorca’s and the IDEmenorca’s case studies agreed that they suffer the following general constraints: inadequate resources and insufficient awareness, poor perception and lack of commitment. The IDEmallorca and the IDEmenorca agree that the specific constraint of not perceiving data as a corporate resource limits their GIS constraints. Further, the IDEC and the IDEmallorca agree on one general and one specific GIS constraint. The general constraint is inadequate IT and GIS skills and support. The specific constraint is GIS not integrated into the decision-making culture.

![Figure 38: General aspects that limited the expansion of the case studies according to the respondent survey](image)

![Figure 39: Specific aspects that limited the expansion of the case studies according to the respondent survey](image)
9.2 Aspects that impact on the Balearic Islands’ organisational SDI development: bottom-up and top-down views

9.2.1 Bottom-up aspects that impact on the Balearic Islands’ organisational SDI development

The strengths and weakness, out of the SWOT analysis, are used as “bottom-up” aspects that impact on the Balearic Islands’ organisational SDI developments. The eSDI-Net+ weighting indicators, the survey results and the research literature served to build the SWOT analysis.

As a result of the “bottom-up” aspects, that impact on the Balearic Islands’ organisational context, there are a series of strengths common to all the Balearic Islands. All the existing Balearic Islands case studies enable value adding services. In other words, they make operational spatial analysis, cartography and other means of geographical information infrastructures. Also, all the Balearic Islands’ case studies have an existing geoportal and view service. Moreover, all SDIs of the Islands have a great level of openness with data services. Furthermore, they all have WMS, and IDEmallorca has WFS. Additionally, there are processes to assess SDI usage and user satisfaction, plus service performance measurements. Further, training is provided to employees. Thereafter, the organisations developing the existing Balearic Islands nodes have a legal status and deal with legal aspects. Finally, the geoportals and the SDI related documentation are in Catalan.

Besides, there are specific strengths for each of the Balearic Islands case studies. The IDEIB is at the “internetwork” GII stage. Moreover, the IDEIB has good support from SITIBSA and a specific budget for the SDI. Further, the IDEIB has a great level of openness with WMS data services. An aspect to emphasise is that the IDEIB has a metadata catalogue with 7.387 ISO 19115 metadata in four languages - Catalan, Spanish, English and German. Therefore, the IDEIB covers all relevant languages and it provides information in a foreign language. Further, the IDEIB has the following functions: SDI manager, Support System and Assistance to the user. Finally, time series are available for orthophotos.

The IDEmallorca’s specific strengths are two. First, the IDEmallorca has a great level of openness with WFS data services. Second, the IDEmallorca has the following SDI functions: a SDI manager, system support, database support, user support and production. Further, in the survey the IDEmallorca was said to be in the network stage. However, for the reasons mentioned in subchapters 7.4.3 and 7.4.4, it’s believed the real stage is the intermediary stage.

The IDEmenorca has the specific strengths of having metadata and a metadata catalogue. However, the metadata doesn’t follow the official standards. Moreover, the IDEmenorca’s first objectives are to implement official standards. Also, as strength the IDEmenorca has the SDI manager and system support functions.

Some weaknesses are common for all the Balearic Islands’ case studies, like: inadequate resources; insufficient awareness, poor perception and lack of commitment; lack of strategy and technology and data problems.

The IDEIB’s specific weakness, from the SWOT results in subchapter 7.3.5, shows clearly that most problems in the IDEIB relate to technology and spatial information. The IDEIB employees are conscious of this situation because in the survey they rated the infoware as the most problematic ware.
The IDeMallorca has some more weaknesses than the IDEIB. However, the IDEIB was developed before and it counts with more budget than the IDeMallorca. The IDeMallorca has many orgware weaknesses that can be seen in the SWOT analysis, in subchapter 7.4.5. The orgware was rated as the most problematic ware in the survey. Altogether, this is due to the lack of support of the Council of Mallorca and to the insufficient staff. Definitively, the council needs to have more awareness of SDIs and data as a corporate resource. Furthermore, users in the Council of Mallorca need more commitment and some extra training in GIS matters. Finally, with more staff probably metadata could be implemented and the metadata and other information could be translated to foreign languages.

The IDeMenorca is the Balearic Islands’ case study with more weaknesses. Thus, in great measure this is due to the survey results. The IDeMenorca opted to mark down more aspects that affect the expansion of SDI than any other case study. From the SWOT results, in subchapter 7.5.5, obviously the IDeMenorca has the same problem as the IDeMallorca with the lack of support of the SDI by the Council of Menorca. To put it simply, it's more delicate in Menorca because they still don’t have a specific budget for the SDI. Also, there’s inadequate equipment and lack of staff that are the other two main problems. Consequently, humanware was rated as the most problematic ware in the survey.

In conclusion, the IDeMallorca and the IDeMenorca could have many problems solved if the SDIs were better supported by the councils. Additionally, more staff would be a very valuable asset. Also, a little more funding would solve problems like inadequate equipment and maybe even would allow hiring more employees.

9.2.2 Top-down aspects that impact on the Balearic Islands organisational SDI development

A summary of INSPIRE’s strengths and weaknesses is based on the literature information of subchapter 3.6 and some extra literature. Accordingly the strengths of INSPIRE are its main objective, its legal framework and its key elements. First, the main objective is to support the formulation, implementation, monitoring, and evaluation of Community environmental policies, and to overcome major barriers still affecting the availability and accessibility of spatial data (Crompvoets, 2009, p.4). Second, the legal framework of INSPIRE has two main levels. At the first, there is the INSPIRE Directive itself. In the second level, INSPIRE envisages technical implementing rules in the form of regulations for metadata, harmonization of spatial data and services, network services, data and service sharing policies, and monitoring and reporting indicators to evaluate the extent of the Directive's implementation and to assess its impact (Craglia, 2010). Third, the key elements of the INSPIRE directive to overcome the barriers mentioned before include: metadata, harmonisation of key spatial data themes, agreements on network services and technologies, policy agreements on sharing and access, coordination and monitoring mechanisms, implementation process and procedures.

Turning to INSPIRE’s weaknesses; it’s a fact that there are still several organisational and technical challenges (and opportunities) that need to be addressed. To begin the most important organisational challenges are as follows:

- maintain the momentum and the high level of commitment of all stakeholders and the experts contributing to the development of the implementing rules;
- organisational challenge in the Member States to implement INSPIRE;
- difficult financial climate that makes it more challenging to invest in new infrastructures and ways of working;
- issues of awareness, education, and training;
- public-sector administrations at the sub-national level still have limited or no
knowledge of INSPIRE (Craglia, 2010).

To end INSPIRE’s main technical challenges are two:

- develop and maintain an infrastructure that works and that delivers added value;
- facilitate the transition from a spatial data infrastructure perspective, toward a spatial information infrastructure, a service providing information products and analyses that are of wider use to nonexperts (Craglia, 2010).

eGovernance

The strengths of the Spanish eGovernment are its strategy, its user-centric approach, its five action line and the eGovernment promotion at local levels. According to the epractice.eu webpage the Spanish eGovernment strategy aims to improve the quality of services provided by Central Government while bringing the public administration closer to citizens and businesses. Further, the 'Avanza' Plan opts for a user-centric eGovernment which overcomes the most serious challenges facing public eServices. For example, their uneven development and quality, as well as their lack of integration when these services are offered by distinct administrations or departments. Thereafter, 'Avanza2' structures around five action lines: development of the ICT sector, ICT training, public eServices, infrastructure and trust and security and accessibility. Finally, Avanza Local, the "municipal arm" of the 'Avanza' Plan, is intended to promote eGovernment at local level areas. The promotion consists of the following issues: diffusion and implementation of the dedicated 'Avanza Local Solutions Platform'; development and implantation of technical solutions of particular use to Local Government; and the release of studies leading to a good practice catalogue for the content and use of municipal applications (epractice.eu).

While the benefits of eGovernment can be significant, achieving the goals of eGovernment is not easy. Regarding weaknesses, important barriers to eGovernment discussed throughout the Egov Toolkit are leadership failures, financial limitations, poor coordination, workplace and organisational inflexibility, and poor technical design (egov.sonasi).

9.3 SDI node and employee discussions

A literature review and a research survey served to find out the IDEC’s experiences from which the Balearic Islands SDI nodes could benefit from. After that, the gathered information helped to identify the SDI organisational status of the IDEC, the IDEIB, the IDEmallorca and the IDEmenorca. Following, according to the SDI organisational context of each of the case studies the most useful experiences of the IDEC for the islands were selected. However, it is probable that if another SDI node had been selected to benefit the Balearic Islands' SDI nodes, other outcomes would have been achieved. For instance, the X Border GDI, led by the province of Limburg, activities are very much problem oriented and user driven. This SDI node has particular reference to emergency management and spatial planning in a densely populated border region (esdinetplus.eu). In this case the research would be more focused on finding emergency management and spatial planning issues that would benefit the Balearic Islands SDI nodes.

Consulting other SDI node employees would have probably served to identify other organisational aspects. It might also be that the different head SDI employees of the case studies interpreted the survey questions in a different way. Further, if another criterion to fill in the SWOT analysis had been followed the results would be different. These issues are due to the non-trivial characteristic of the SDI concept, in that it’s ambiguous and multifaceted. However, the research methodology adopted for this study and the embedding of the study in literature keeps these risks within acceptable limits.
10 Results

10.1 From what organisational experiences and developments could the Balearic Islands’ SDI benefit from Catalonia’s SDI?

The following lines answer the main research question - From what organisational experiences and developments could the Balearic Islands’ SDIs benefit from Catalonia's SDI? In this chapter, the SDI assessment dilemma of seeing the uniqueness of each SDI node is strongly defended.

The experiences are divided in four themes:

- general literature “how to” aspects;
- local and sectorial considerations;
- organisational aspects;
- economical aspects.

Theme 1. General literature “how to” aspects

1. Learn from other experiences

Learning from other experiences is always a good way to start implementing a SDI. The Balearic Islands are culturally and physically proximate to Catalonia. It is understandable that the insufficient staff numbers to implement and operate GIS doesn’t allow the Balearic Islands’ SDI node employees to do a research of all the existing SDI best practices to find the most convenient model to follow. This research pretends to ease information to the Balearic Islands’ SDIs about the most important experiences and benefits of the IDEC. In fact in the research survey the IDEIB admitted they use the IDEC as a model.

The conditions that could contribute to manage the Balearic Islands- IDEIB, IDEmallorca and IDEmenorca- SDI projects could be similar to the IDEC conditions of subchapter 8.8. The IDEC learnt from other experiences and considered some organisational models applied to other European regions. A summary of these conditions that could be applied to the Balearic Islands’ SDIs, are below:

- Obtain maximum participation for the SDI;
- Achieve institutional collaborations;
- Orient results to end-user, short-term projects and concrete applications;
- Assure non-permanent financial resources;
- Give initial support, even with human resources, on Metadata implementation to collaborating organisations;
- Convince people introducing the SDI project of its importance.

All the general constraints: inadequate resources; insufficient awareness, poor perception and lack of commitment; lack of strategy; inadequate IT and GIS skills and support; and technology and data problems of the Balearic Islands’ case studies can benefit by learning from other experiences. For instance, the IDEC at the network GI stage, has gone through all the GII stages and there is a great variety of documentation on many processes and experiences which the Balearic Islands SDIs could learn from. Therefore, the IDEC found solutions for orgware, humanware and infoware that could benefit the Balearic Islands SDI nodes.
Theme 2: Local and sectorial consideration

2. Importance of encouraging local entities

It would be ideal if all the municipalities of Mallorca and Menorca could document their information resources with metadata, publish this information in catalogues and enable access and sharing through web services like the IDEC Local. The experience of the IDEC shows that this encouragement of local entities boosts the utility of the IDEC by bringing local entities and citizens closer together. Also, the web services offered by local entities (e.g. map viewers and street maps) to the citizens are highly appreciated and used. Besides, the Balearic territorial planning could aim for a political framework including an important role for local public administration and other public bodies responsible for urban development as in the Catalan territory. Therefore, the Balearic Islands could benefit from the line of the values demanded of the new policies for Catalan territorial planning. The bases of these policies are: availability of territorial information; corporate transparency; intercommunication among different players; democratisation; and public participation.

If local entities implemented a GIS system and worked on it whenever they could, they would heal the inadequate resources insufficient staff problem of the Balearic SDI nodes. Additionally, if local entities worked on the GIS systems it would mean that GIS awareness exists. In other words, encouraging local entities to use GIS would aid the insufficient awareness, poor perception and lack of commitment constraint. Furthermore, all the geowares would benefit by the local entities help. For the infoware, there would be a production and maintenance of more data. For humanware, more employees would be working on GI aspects of the islands. And regarding orgware, the SDI nodes and the local entities would set agreements and cooperations.

3. Coordination and collaboration between the regional and local entities

The Balearic Islands’ case studies could benefit from a figure like the Catalan CCC (see Appendix I). In this way the islands would have a basic body of the coordination and collaboration between the regional administration and the local entities in the area of cartography and related geographic information.

A CCC figure was expected to be created as a result of a cartographic law of the Balearic Islands, according to the head of the IDEIB support department. However, there is still no cartographic law and the priority given to elaborating a land act leaves it on a second place. Therefore, the approval of a cartographic law of the Balearic Islands, and as a consequence the creation of the CCC, is improbable this legislation. However, the bilateral collaborations between the government, IDEIB, and the Insular Councils aids this situation. Further, a solution could be that employees of the Balearic Islands’ SDI nodes and other organisations of the Balearic Islands adopt CCC roles. And these employees could dedicate a small portion of their time to CCC aspects.

A figure like the CCC in the Balearic Islands’ would solve technology and data problems at the local level. Besides, the CCC would build a strategy so the SDI could be implemented at the Balearic Islands local level. Thereafter, another of the CCC functions would be to spread GIS/SDI awareness among the Balearic local administrations. Furthermore, the CCC would give support to the local Balearic administrations. Additionally, the CCC would mean benefits for the geowares. The humanware, infoware and orgware of the local entities would benefit by the support of the CCC. Accordingly, the CCC would aid the following constraints: technology and data problems; Insufficient awareness, poor perception and lack of commitment; lack of strategy, inadequate IT and GIS skills; humanware, orgware and infoware.
4. Sectorial approach
The IDEC’s project strategy based on creating sectorial or specialised SDIs has proofed to work well. The IDEC’s sectorial SDI’s offer better and more coherent services to end-users. Also, the sectorial approach can be compatible with a total “open” configuration. Maybe, the IDEIB, the IDEmallorca and the IDEmenorca could also benefit from this strategy. The sectorial strategy in the Balearic Islands could consist in constructing specialised SDIs for specific areas. An option could be that the Balearic Islands get ideas of the IDEC’s existing sectorial initiatives and that they consider if the sectorial approach could be useful for them and for what areas. The existing IDEC sectorial initiatives are: the IDEC Local (local entity SDIs), Coast Management SDI’s and SDI Universe (for the Universities of Catalonia).

A sectorial approach for the Balearic Islands would heal the lack of strategy constraint. For instance, an information strategy would be built for each sectorial approach adopted by the Balearic Islands SDI nodes. Likewise, this would lead to a business case with a clear plan for implementing the sectorial approach. Besides, the GIS and SDI being the basis of the sectorial approach would integrate the decision making culture. Conversely, the orgware and infoware constraints of the Balearic Islands could benefit by this strategic approach to organise the data in specific themes.

Theme 3: Organisational aspects

5. Support of the SDI in the organisation
A good support of the SDI in the organisation is important. Thanks to the survey it is known that the IDEC and the IDEIB receive a good support by the organisation they belong to. However, the IDEmenorca and the IDEmallorca have a limited support by the Insular Councils. The IDEmenorca still doesn't even figure on the annual budgeting of the Council of Menorca.

A good support of the SDI in the organisation is the basis for a successful SDI. Therefore, all the constraints (inadequate resources; insufficient awareness, poor perception and lack of commitment; lack of strategy; inadequate IT and GIS skills and support; and technology and data problems; humanware, infoware and orgware) of the Balearic Islands could benefit from having a good support. It’s a matter of fact that the IDEmallorca and the IDEmenorca suffer from a lack of support in their organisations. Therefore, in this research it is considered that one of the main objectives of the Insular council SDI nodes is to raise awareness of their importance.

6. Raise awareness on SDI benefits
The IDEIB holds, since 2007, annual working group meetings and other SDI promotional means. Besides, publicity of the benefits of the Balearic Islands SDI nodes is never too little. A way to raise awareness of the applications and benefit of the Balearic SDI nodes could be like the IDEC does through workshops. Also, there is the annual GIS FORUM on new technologies, and the Balearic Islands SDI nodes could publish and distribute several brochures on the meaning, goals and impacts of the SDI nodes.

It is possible to apply Guimet’s (2003), following, exact words used for the IDEC to the Balearic Islands SDIs. “In the future, once the potential of the IDEIB, the IDEmallorca and the IDEmenorca has truly been realised (i.e. expanding to more municipalities, providing more and better information) it will be of notable importance to the distribution of territorial knowledge. This is critical for effective communication between the public (e.g. social organisations, professionals and public agents) and local institutions. This dialogue will provide citizens with a new role in territorial politics, making it more transparent, more participative and better suited to the needs of society”.
The day the potential of the IDEIB, the IDEmallorca and the IDEmenorca is realised it will mean there is sufficient awareness about GIS and SDIs. Accordingly, the insufficient awareness, poor perception and lack of commitment and the lack of strategy constraints would benefit by the distribution of territorial knowledge. Some of the benefits of raising awareness of the importance of the Balearic Islands SDIs could be: top-level commitment, IT awareness and GIS potential, capture of the politicians’ imagination and open and innovative perceptions of senior managers, staff and citizens. Additionally, the orgware would be the main benefited ware because of the organisations commitment, awareness and perception of the SDI.

7. More partnerships
From the results of the survey all the Balearic Islands case studies have been working on their partnerships at the possible measure for their GII stage. This way the IDEIB has more collaborations than the IDEmallorca and the IDEmenorca. However, it would be great if the IDEmallorca and the IDEmenorca could set more collaborations with public organisations like the IDEIB and the IDEC have, specially with all the municipalities. The head of Menorca’s cartography technical group as an observation said there weren’t any collaborations with private organisations in IDEmenorca. However, only the general number of partnerships was investigated for this report. The exact number of partnerships with public and private partnerships was out of scope.

The ideal for the IDEIB, the IDEmallorca and the IDEmenorca would be for them to play an important role in the future in education, training and developing a geographically more conscious culture. As with the IDEC case, this ideal could build up when many public and private organisations want to make their geodata available through the IDEIB, the IDEmallorca and the IDEmenorca networks. Also, if more private companies express their interest in appearing in the IDEIB, the IDEmallorca and the IDEmenorca metadata Catalogue servers and in providing access to some layers as well, this could be a good way for them to advertise their products and services.

The increase of partnerships in the Balearic Islands' SDI nodes would benefit the insufficient awareness, poor perception and lack of commitment. In this way, the awareness of the potential of GIS and SDIs would grow, also the politicians would be interested in an initiative with many partnerships. Further, the orgware and infoware would benefit from collaborations with many organisations in order to share data.

8. Digital information available
Digital information has to exist and be available on line. If information does not exist, the information infrastructure has no sense. Anyhow, a SDI can help to issue and spread new information and promote the existing one. The Institut Cartogràfic de Catalunya (Map Agency of Catalonia) started the policy, in the middle of the year 2003, to put at the public disposal orthophoto and topographic maps, toponymy and other cartographic data (Guimet, 2004b, p.5).

The IDEC has Information layers that can be included in INSPIRE themes. Out of all the Balearic case studies only the IDEIB has published Information layers that can be included in INSPIRE themes. Therefore, the IDEmallorca and the IDEmenorca would have added value if they published INSPIRE information layers. However, only 7 of the IDEIB ISO themes have more than 20 layers. The following themes have less than 20 layers: farming, climatology, ecology, economy, structure, geoscientific information, location, oceans, planning and cadastre and society. Therefore, also, the IDEIB could benefit by adding more layers to the ISO themes in a near future.

All the Balearic Islands case studies have WMS. On the other hand, only the IDEmallorca has WFS. The IDEIB and the IDEmenorca could implement some WFS. Also, all the
Balearic Islands case studies could benefit by observing the different WMS themes IDEC has. For instance, the Balearic Islands don’t have WMS covering: habitats, street maps, cadaster, service/equipments or functional delimitations.

The technology and data problems should benefit by having the available digital information available online. Therefore, if all data is online for free the problems of not affordable digital data should solve. Thereafter, the infoware constraints will define by existing available data being online. Although, some data problems might appear while preparing the information to show online, the benefits are higher than the problems.

9. Focus on end users
The IDEC was selected best practice with respect to its strong user involvement. Therefore, this is an important point for the Balearic Islands to consider.

For the case studies of the Balearic Islands, scheduling the end-users objectives and interests could be a valuable asset. And the way to know the end-users objectives could be through a GIS market survey. Such a GIS survey would allow the Balearic Islands to have an inventory document with conclusions and proposals for strategies and policies in public services. This document was done for the IDEC and proved to be very useful.

The IDEIB, the IDEmallorca and the IDEmenorca, according to the survey, believe that a document like the “White book of the GIS sector in Catalonia” would be useful for the Balearic Islands.

The Catalan universities collaborated in doing the GIS market survey. Also, the University of the Balearic Islands could collaborate to do the Islands GIS market survey. Following the study of Catalonia, the Islands study could focus on two main groups of users: institutional users and value-added private sector companies using the main IDEIB services, and local authorities using the IDEmallorca and the IDEmenorca Insular Council’s applications. The objectives of the study of the Balearic case, as the Catalan case (Craglia, 2008, p.12) could be to:

- quantify changes in the sector;
- assess the job market for GI technicians and evaluate GIS education;
- study market trends for products and technologies;
- analyse the impact of new regulations on the sector, as well as new active elements (e.g. Google, Microsoft Live and SDIs).

Exactly the same as the Catalan GIS market survey, the aim of the Balearic GIS market survey could be to collect information on how online GIS applications for end-users are used (e.g. Google and IDEIB, IDEmallorca and IDEmenorca); predict future trends; and determine the opinion of end-users on services offered by the IDEIB, the IDEmallorca and the IDEmenorca (e.g. the Catalogue and the Client) or by other institutional providers.

A result of the GIS market survey could be the implementation of strategies and policies for public services in the Balearic Islands case studies. A clear plan for implementing the SDI of the islands with focus on end-users and the human – affairs issue could be taken over. In summary, the lack of strategy constraint would benefit from the Balearic Islands’ GIS market survey. Further, the orgware would, also, benefit from the strategic end-users plans.

10. System engineering point of view
The Balearic Islands’ case studies could apply “know how” to practical results by means of projects. For this, the following aspects could be considered for the Balearic Islands’ case studies SDI projects:

- SDI project requires objectives, resources and time;
• SDI objectives have to be clear;
• technological resources exist and operate correctly with a relative low cost;
• development and success of SDI depends on organisation as well as policy, legal framework, institutional culture, socio-economic framework and other elements more than technology, and imply a higher cost (Guimet, 2003, p.7).
• different elements need to be combined and managed together, like: Map Agency + E-GOVERN + SECTOR, METADATA, CATALOG, INTEROPERABILITY, GEOPORTAL, SERVICES sector support, social marketing, legal framework and Internal analysis (Guimet, 2003, p.6).

The lack of strategy constraint could heal by the system engineering point of view. Specially, the specific constraint of lack of IT strategy resulting in an inadequate technical context could benefit from the five engineering aspects, above. Thereafter, a good planification could aid the inadequate resources problem. Furthermore, according to the engineering approach technological resources exist and operate correctly with relative low cost (technology and data problems constraint). Moreover, with clear objectives, resources and time the responsibilities should be specified and then departmental barriers should disappear (Inadequate IT and GIS skills and support constraint). Also, insufficient awareness, poor perception and lack of commitment could benefit from the engineering point of view. Besides, orgware, humanware and infoware could benefit from the system engineering point of view.

11. Consider project environment
Guimet’s (2004b) advice that “the project environment has to be considered before, during and after the process” could be followed by the Balearic Islands’ case studies. To follow this consideration it’s necessary to: face troubles, show information and make it accessible to end-users, and the non-public accessibility of the data has to be counter-argument for usual reasons. Information will never improve if it’s not shown. To improve information a good idea is to press politics.

In the case of the Balearic Islands’ case studies the initial framework of the IDEC’s support to the project could be useful. The initial frameworks that could be considered are as follows:
• preferable that the initiative arise from more than one Department;
• convince and train before to rule;
• necessary not only to convince the innovative people, but mainly the pragmatic ones, if we want to succeed.

Considering the project environment could solve the inadequate IT and GIS skills. In first place, if initiatives rise from more than one department there shouldn’t be as many department barriers to effective communication. Second, convinced and trained employees will have more GIS skills and will be aware of Information Infrastructures. Further, avoiding a leading role will probably make employees feel more comfortable and will enhance better relations and communication. Additionally, humanware and orgware will benefit from considering the project environment.

Theme 4: Economical aspects

12. eGovernment funding: Open Balearic Association consortium

It’s not in the hands of the SDI nodes of the Balearic Islands to decide on being funded by the eGovernment of the Balearic autonomous community. Further, an eGovernment lobby could be created between the Balearic Islands SDI nodes. The objective of this lobby could be setting up an Open Balearic Association consortium similar to the AOC consortium. The AOC consortium is an instrument for the Catalan administrations to facilitate and make more
effective eGovernment. The AOC wants the active participation of all local authorities of the
territory in the creation and maintenance of services of this Spatial Data Infrastructure
government - compliant services and support of GIS projects could use these eGovernment incentives.

eGovernment funding could solve the inadequate resources constraint. More budget towards
the SDIs would mean the possibility to contract more staff. This would solve the insufficient
staff constraint that is one of the main constraints of IDEMallorca and IDEMenorca. Accordingly, the infoware, humaware and in consequence the orgware would benefit from
the eGovernment incentives.

13. Total investment paid back in 6 months
IDEC's total investment over 2002-05 was paid back in less than 6 months based on the
benefits identified for 2006 alone. It's impossible to compare, yet, the Balearic Islands' benefit to the IDEC. The main reason of this is that four years still haven't passed since the
creation of any of the Balearic Islands SDIs. Furthermore, this experience of the IDEC is the
profit of combining all the other IDEC experiences. Also, the uniqueness of the IDEC and the
uniqueness of the Balearic Islands case studies have to be seriously considered. However,
having the total investment of four years paid back in six months would be an ideal
experience for the Balearic Islands SDI nodes to share with the IDEC. Maybe, these 13
experiences of this thesis research could help the Balearic Islands’ case studies reach a
similar economic impact.

In the case the total investment of the Balearic Islands SDI nodes would be paid back in six
months it would mean that all the constraints would have been solved in one way or the
other. Also, the problems with the orgware, infoware and humanware would have been
solved.

Summary of the 13 experiences of the IDEC from which the Balearic Islands could
benefit from.

In summary, according to the estimates of this research, the organisational aspect (theme 3) is the
IDEC's experience from which the Balearic Islands SDI nodes could find more benefits (figure 40). Thereafter, by order, the rest of IDEC's experiences' themes that could benefit the Balearic
islands, are: local and sectorial approach, general literature “how to” and the economical aspects. Furthermore, the four themes are a combination of specific aspects. Accordingly, the specific aspects that solve more constraints for the Balearic Islands case studies are four. These are as follows: learn from other experiences (general literature “how to” aspects), support of the SDI in the organisations (organisational aspects), system engineering point of view (organisational aspects) and investment paid back in 6 months (economical aspect) (figure 41). However, that these specific aspects solve more constraints doesn't mean that out of all they're the most urgent or necessary aspects for
the Balearic Islands. Further, if the estimates applied to the specific aspects had been done
with a different criterion these results would be different. Finally, the recommendations (see
subchapter 11.2) have been done considering the most urgent and necessary IDEC experiences that could benefit the Balearic Islands.

Figure 41: Specific aspects that could benefit the Balearic Islands SDI nodes

10.2 Most useful theory

In the following lines there’s a list of the most useful theory. In first place from chapter 2 the non-trivial aspects of SDIs, the top-down, bottom-up vision (SDI hierarchy subchapter) and the potential direct and indirect impacts on the other levels of SDIs (SDI hierarchy subchapter) have been the most useful theory. The non-trivial aspects of SDIs have been considered during the entire thesis. It is present that the SDI concept is ambiguous, multifaceted and its assessment is non-trivial. Thereafter, a way of knowing if more importance is given to diversity and heterogeneity or standardisation of the case studies is through the top-down and bottom-up visions. Further, the case study impacts on the other levels of SDIs table serves to show an overview of the interadministrative relationships. In second place from chapter 3 the triangular structure of organisations, “substate” GIS constraints and the SWOT analysis have been the helpful literature applied to the case studies. The triangular structure of organisations served as a clear way of identifying and drawing the roles which the organisations fulfil, and the levels at which they are used in the case studies. Thereafter, the constraints that have limited the potential development of GIS in local government have been useful for the case studies for the variety of indicators and for being suitable for local environments. The SWOT was handy for auditing the case studies organisation and their environment. Also, the SWOT was a good way to find out benefits and weaknesses of the SDIs. In chapter 8 the experiences, developments and benefits of the IDEC served as a model for the Balearic Islands case studies. Most of the results, discussions and conclusions are based on IDEC’s experiences and developments.

After the literature review it was found out that some important aspects of the most useful literature were lacking or could be completed. First from chapter 2 there is little known and published about sub-national autonomous region and local SDI levels. Second from chapter 3 the orgware, maturity matrix, eSDI-Net+ indicators were aspects of theory that for one reason or another were found to be incomplete. The sub-national autonomous region and local SDI levels are an important and large part of the administration. Therefore, it is necessary to encourage researchers to study this administrative level. Further, there isn’t much literature about orgware applied to SDIs. Also, it would be interesting to encourage researchers to study this field. Thereafter, even though the maturity matrix was useful to get
an overview of the cases studies’ level of coherence more detail for the stages of GII development would be useful. For instance, a set of indicators could be developed to help define the exact GII stage. Further, the never ending evolution and development of SDIs will make the organisations in the network stage nowadays be obsolete in ten years time. Therefore, more substages should probably be created and the stages should be adapted to the constant evolution. Also, for the orgware characteristics at a specific stage of institutional development a list of indicators could help to determine the characteristics. Finally, the five main criteria of the eSDI-Net+ best practice assessment framework are too general and don’t give the most appropriate questions to determine the criteria. However, they are important for the case studies because they give an overview of the SDIs. Also the SWOT analysis and the survey questions are based on them. The aspects of the five main criteria that need to be discussed are:

- **Quantity.** No mention is done of the number of workers or extension of the territory the SDI covers. And for example the IDEmenorca covers a smaller extension and has less employees than the IDEC. Therefore, logically IDEC has more data layers than the IDEmenorca because of the larger territorial extension. It’s true that a person interested in a specific SDI can look up the extension but it would be easier to read in the inform.

- **Quality.** There is missing a checklist of indicators to determine the grade of stress on precision and quality issues and the type of value-adding services that exist. It would be useful to ask in what % are the geoportal facilities, discovery service, metadata catalogue, view services and Web GIS used. Then if there’s a low % weight of usage a best practice or guide of measures could be presented.

- **Co-operation and subsidiary.** There should be a checklist of indicators to find out the exact strengths of a leading party. The % of the costs and number of local authorities, public bodies and other partners in the SDI would be useful. A checklist of indicators that form a structured and formalized network would be useful. Further, network best practices could be provided to help. Finally, a checklist of users training could be provided to have as a result a list of the type of training to analyse if it’s useful or not. Further, for the user’s training a capacity building model could be designed to aid each individual’s type of SDI organisation’s needs.

- **Sustainability.** A guide or best practice of what to do after the socio-economic impact analysis and on methods to obtain a specific budget to sustain the SDI would be useful. For instance IDEmenorca could be aided by a guide on methods to obtain a specific budget to sustain the SDI. Further a list of indicators to show the fulfilled aspects of a legal status would be helpful. Also, a checklist of legal aspects to have a record of what exists and what is missing would be necessary.

- **Users’ usability.** This indicator could be more complete, getting the whole answer to the questions, not just yes or no. A question of the exact relevant languages and foreign language would be useful. And if the SDI isn’t based on a users requirement analysis the question of why? would be helpful. Further, a checklist of indicators of the level of openness of the SDI access and payment could also help to complete this criterion. Instead of only the number of organisations involved in the SDI, also, a list of names of organisations would useful. Finally, if there are procedures to assess SDI usage and user satisfaction the question of which are they would be helpful. Also, if there aren’t any the question of why? would solve many doubts.
Part 6

Thesis conclusions and recommendations
11 Conclusions and recommendations

11.1 Conclusions

From what organisational experiences and developments could the Balearic Islands’ SDIs benefit from Catalonia’s SDI? is the main research question of the thesis.

After following the research stages (initiation, design, implementation and evaluation) as presented in figure 10 (thesis research approach), and described in chapter 5, thirteen experiences and developments of the IDEC that could benefit the Balearic Islands’ SDI were found (see chapter 10.1). The 13 experiences are the following ones: (1) learn from other experiences, (2) importance and encouraging of local entities, (3) coordination and collaboration between the regional and local entities, (4) sectorial approach, (5) support of the SDI in the organisation, (6) raise awareness on SDI benefits, (7) more partnerships, (8) digital information available, (9) focus on end-users, (10) system engineering point of view, (11) consider project environment, (12) eGovernment funding, (13) total investment paid back in 6 months.

A few subquestions answered the main research question:

A. What is Spatial Data Infrastructure?

SDI initiatives are non-trivial and they create, maintain and disseminate spatial data. The SDI concept is challenged by its ambiguity for two reasons. Understanding SDI is still in its infancy with many open questions and it has a multi-faceted nature. The term Spatial Data Infrastructure (SDI) is often used to denote the relevant base collection of technologies, policies and institutional arrangements that facilitate the availability of and access to spatial data (GSDI Cookbook, 2004, p.8). A sum of people, access issues, policies, standards, data issues, institutional frameworks and financial resources are the components of an SDI. The sub-national government level of a SDI hierarchy is similar to the operational tier of an organisational structure (Rajabifard, 2006, p.4). Some of the examples of best practice are to be found at the sub-national level (Craglia, 2009, p.22).

B. What are organisational aspects?

An organisation is a process to reach a specific objective through people who make up and administer something. Geographic Information resources are another way of describing organisations by the means of geowares. Besides, Information System’s roles and levels can be identified through a triangle organisation structure. The GII evolution from a stand-alone into a network organisation obeys to the stages of GII development. Each of the stages has specific characteristics. Every participant in a SDI project has a position in terms of their responsibilities, and roles. INSPIRE and eGovernment have important “top-down” responsibilities. Further, there exist many “bottom-up” constraints which need changes in the roles and responsibilities of its participants. At the end the level of coherence of the geo-information community is assessed with a maturity matrix. Besides, an organisation and its environment can be audited with a SWOT analysis.

C. What is the general Spanish NSDI frame of reference?

The IDEE is a joint effort of authorities at the national, regional and local levels. All of these entities enjoy autonomy for the administration of their respective interests. The IDEE is an initiative to integrate data, metadata and geographical information produced in Spain into Internet. Further, the Spanish eGovernment strategy aims to
improve the quality of services provided by Central Government while bringing the public administration closer to citizens and businesses.

D. What is the status of the organisational context (orgware) of the SDIs in Catalonia and the Balearic Islands?

The organisational context, legal aspects, maturity matrix and SWOT analysis of all the case studies (chapters 7 and 8) served to answer this subquestion. The following lines summarise some of the most important organisational aspects of the case studies. The IDEC and the IDEIB are at the network and “internetwork” GII stage, respectively. Both have a very similar triangular structure organisation profile based on their responsibilities. Also, the IDEC and the IDEIB, have 3 permanent SDI employees and then other specialised GIS employees. Likewise, the IDEmallorca, at the intermediary GII stage, and the IDEmenorca, at the exchange GII stage, follow a similar triangular organisation pattern. Besides, the IDEmallorca and the IDEmenorca have two employees for both GIS and SDI jobs. Regarding partnerships IDEC maintains informal agreements with many organisations, about 70. On the contrary, the IDEIB maintains partnerships with a few public organisations (Councils, University, Land Registry, all municipalities of Mallorca...). Conversely, the IDEmallorca has partnerships with about six organisations. In contrast, the IDEmenorca by agreements has partnerships with the councils of Menorca, and Mallorca and the government of the Balearic Islands.

E. What “top-down” aspects impact on the Balearic Islands’ SDI developments? And vice versa, what “bottom-up” aspects impact on the Balearic Islands’ SDI development?

The “bottom-up” and “top-down” aspects that impact on the Balearic Islands’ SDI developments belong to the SWOT and literature research strengths and weaknesses. The importance given to “bottom-up” aspects is because they are results from the case studies. There are a series of “bottom-up” strengths common to all the Balearic Islands: enable value adding services, existing Geoportal and view service, great level of openness with data services (WMS), processes to assess SDI usage and user satisfaction, service performance measurements, training provided to staff, legal status of organisations developing the Islands nodes and SDI related documentation in Catalan. Some weaknesses are common for all the case studies like insufficient staff numbers to implement and operate GIS. Besides, each of the Balearic Islands nodes has specific weaknesses. On the other hand, in subchapter 9.2, there’s information on INSPIRE’s and the eGovernment’s strengths and weaknesses. These two are the most relevant “top-down” institutions that regulate the SDI.

The Balearic Islands’ autonomous region is a sub-national entity in the initial phase of building its SDI. The archipelago’s taking its first SDI steps and affronting the challenges that this supposes. Considering the IDEC as the best SDI node from which the Balearic Islands SDI nodes could benefit from obeys to the cultural and physical proximity of both regions. However, during all the research, there’s been consideration about the non-trivial aspects of the SDI assessment. The three important aspects considered in the non-trivial assessment of SDIs are: ambiguity, multi-faceted nature and non-trivial SDI assessment with the need to cope with risk.

The first objectives for all the Balearic Islands SDI nodes to solve according to this research are the lack of strategy and technology and data problems constraints. Further, the IDEmallorca and the IDEmenorca need to solve the following constraints: lack of support of the Councils to the SDI node, inadequate resources and insufficient awareness, poor perception and lack of commitment constraints. To solve these constraints the Balearic
Islands SDIs can benefit from the experiences and developments of the IDEC (see in subchapter 10.1).

The most useful theory (see subchapter 10.2) of the research is as follows: non-trivial aspects of SDIs, top-down and bottom-up vision, triangular structure of organisations, potential direct and indirect impacts on other levels of SDIs, constraints that have limited the potential development of GIS in local government and SWOT analysis. Further, the important aspects of literature that are lacking or could be completed are the following ones: sub-national autonomous region and local SDI levels; orgware applied to SDIs; stages of GII development of the maturity matrix; eSDI-Net+ best practice assessment framework.

Examining IDEC’s set of experiences, developments and benefits chosen to benefit the Balearic Islands’ SDIs one may conclude that they are useful for the enhancement of the Balearic Islands’ SDIs in a strategic and innovative way.

11.2 Recommendations

The top 4 things the Balearic Islands SDI nodes could do on a short term are as follows:

- Perform a socio-economic impact analysis (like the white book of the GIS sector in Catalonia).
- Raise awareness on the potential of the Balearic Islands SDI nodes.
  - The primary aim is to encourage local entities to implement GIS systems. To aid the local entities GIS/SDI implementation an Open Balearic Association Consortium could be created.
- Create a Cartographic Coordination Commission.
- Apply a system engineering point of view.
  - The main objective is for IDEmallorca and IDEmenorca to create official metadata. Further, in second place, IDEIB and IDEmenorca could add some WFS on their geoportals.

From the previous discussion, derive the following recommendations for further research:

- A future research to know the application grade of IDEC’s experiences on the Balearic Islands SDI nodes.
- A report of the results obtained by using other best practice eSDI-Net+ winner’s experiences for the Balearic Islands benefits.
- A research on the sub-national and local SDI level, with special attention on the autonomous communities in the case of Spain.
- A study on how to make the stages of GII development more detailed and adapted to the evolving SDIs.
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### Appendix I: CCC composition.

<table>
<thead>
<tr>
<th>13 representatives of the Generalitat</th>
<th>13 local representatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>President: Counsellor Policy and Public Works</td>
<td>1 person in representation of Barcelona’s town hall</td>
</tr>
<tr>
<td>First Vice-presidency: Director of the Cartographic Institute of Catalonia</td>
<td>1 person in representation of the mancomunities of municipalities of Barcelona</td>
</tr>
<tr>
<td>1 person representing the Department of Agriculture, Food and Rural Action</td>
<td>1 person in representation of each of the local territorial entities with cooperation and municipal assistance functions</td>
</tr>
<tr>
<td>2 persons representing the Department of Economics and Finance</td>
<td>The others have to be designated by the bipartite way by the most representative municipalities</td>
</tr>
<tr>
<td>1 person representing the Department of Governance and Public Administration</td>
<td>1 secretary</td>
</tr>
<tr>
<td>1 person representing the Department of Environment and Housing</td>
<td>1 person at the service of the represented administrations (designed by the commission presidency)</td>
</tr>
<tr>
<td>1 person representing the Department of Interior, Institutional Relations and Participation</td>
<td></td>
</tr>
<tr>
<td>1 person representing the Department for Innovation, Universities and Enterprise</td>
<td></td>
</tr>
<tr>
<td>3 persons representing the Department of Territorial Policy and Public Works, including the competent geology and geophysics</td>
<td></td>
</tr>
<tr>
<td>1 person representing the ICC</td>
<td></td>
</tr>
</tbody>
</table>

CCC composition (www.icc.es)
Appendix II: list of eSDI-Net+ / Indicator’s weighting and indexes’ building

There are three indicators out of the 33 eSDI-Net+ ones that haven’t been investigated because they’re not considered relevant for the research. Those three indicators are the following ones: specific stress on precision and quality issue (however a question was done about data quality); costs shared among all partners; structured and formalized network of those that are involved.

<table>
<thead>
<tr>
<th>Field name</th>
<th>Criteria</th>
<th>Indicators</th>
<th>Coding</th>
<th>Reclass.</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recomm</td>
<td>Quantity</td>
<td>Is the SDI recommended, after National WS, in its class, as best practice at the national level?</td>
<td>Yes as best practice = 1 yes, as good practice = 2 no = 3 missing = 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quan_1</td>
<td>Quantity</td>
<td>Number of information layers in the SDI</td>
<td>#</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quan_2</td>
<td>Quantity</td>
<td>Number of information layers in the SDI that could be included in INSPIRE Spatial Data Themes List of Annex I, II and III</td>
<td>#</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quan_3</td>
<td>Quantity</td>
<td>% of information layers that are provided with a visualization service (WMS)</td>
<td>% /10</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>Quan_4</td>
<td>Quantity</td>
<td>% of information layers that are provided with a download service (WFS or different)</td>
<td>% /10</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>Quan_5</td>
<td>Quantity</td>
<td>% of information layers in the SDI provided with standard metadata (ISO19115, INSPIRE IR, Dublin Core…..)</td>
<td>% /10</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>Quan_6</td>
<td>Quantity</td>
<td>% of services in the SDI provided with standard metadata (ISO19115, INSPIRE IR, Dublin Core)</td>
<td>% /10</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>Quantity</td>
<td>Sum of weights</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qual_1</td>
<td>Quality</td>
<td>Is there a specific stress on precision and quality issues?</td>
<td>yes = 1 no = 2 missing = 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qual_2</td>
<td>Quality</td>
<td>Does the SDI enable value-adding services (spatial analysis, cartography, indicator computation, etc.)? yes = 1</td>
<td>yes = 1 no = 2 missing = 9</td>
<td>10 1 1</td>
<td>0.1</td>
</tr>
<tr>
<td>Qual_3</td>
<td>Quality</td>
<td>Does the SDI have geoportal facilities, i.e. are there functions that let merge information from various portals or platforms in order to support data sharing? yes = 1</td>
<td>yes = 1 no = 2 missing = 9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Qual_4</td>
<td>Quality</td>
<td>Is there a discovery service (CSW, cfr. INSPIRE IR for Discovery and View Services)? yes = 1</td>
<td>yes = 1</td>
<td>10</td>
<td>0.3</td>
</tr>
</tbody>
</table>
| Qual_5 | Quality | Is there a metadata catalogue with a search engine (also not INSPIRE compliant)? | yes = 1  
| no = 2  
| missing = 9 | 10  
| 1  
| 0.3 |
| Qual_6 | Quality | Is there a view service (WMS, cfr. INSPIRE IR for Discovery and View Services) | no = 2  
| missing = 9 | 10  
| 1  
| 0.3 |
| Qual_7 | Quality | Is there a WebGIS for view functions (also not INSPIRE compliant)? | yes = 1  
| no = 2  
| missing = 9 |
| Coop_1 | Co-operation and subsidiarity | Is there a strong leading party in developing or implementing the SDI? What is it? | Local Authority = 1  
| other public body = 2  
| others = 3  
| no strong leading party = 4  
| missing = 9 |
| Coop_2 | Co-operation and subsidiarity | Are all costs shared among all partners (in cash or in kind)? | yes = 1  
| no = 2  
| not applicable = 8  
| missing = 9 | 10  
| 1  
| 0.2 |
| Coop_3 | Co-operation and subsidiarity | Number of Local Authorities bodies in the SDI | #  
<p>| not applicable = |</p>
<table>
<thead>
<tr>
<th>Coop_4</th>
<th>Co-operation and subsidiarity</th>
<th>Number of other public bodies partners in the SDI</th>
<th># not applicable = 8 88 missing = 999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coop_5</td>
<td>Co-operation and subsidiarity</td>
<td>Number of other partners in the SDI from private sector</td>
<td># not applicable = 8 88 missing = 999</td>
</tr>
<tr>
<td>Coop_6</td>
<td>Co-operation and subsidiarity</td>
<td>Is there a structured and formalized network of those that are involved?</td>
<td>yes = 1 no = 2 not applicable = 8 missing = 9</td>
</tr>
<tr>
<td>Coop_7</td>
<td>Co-operation and subsidiarity</td>
<td>Is some users' training organized and/or offered?</td>
<td>yes = 1 no = 2 users training not needed = 83 missing = 9</td>
</tr>
<tr>
<td></td>
<td>Co-operation and subsidiarity</td>
<td>Sum of weight</td>
<td></td>
</tr>
<tr>
<td>Sust_1</td>
<td>Sustainability</td>
<td>Have you done socio economic impact analysis?</td>
<td>yes = 1 no = 2 missing = 9</td>
</tr>
<tr>
<td>Sust_2</td>
<td>Sustainability</td>
<td>Has the SDI a specific budget/clear business model to sustain it?</td>
<td>Yes=1</td>
</tr>
</tbody>
</table>

126
| Sust_3 | Sustainability | Has the organisation driving the SDI a legal status? | yes = 1  
no = 2  
not applicable=8  
missing = 9 |
|--------|----------------|-------------------------------------------------|---------------------------------|
| Sust_4 | Sustainability | Does the SDI clearly deal with legal aspects (intellectual property rights – IPR, public sector information – PSI, data base protection – DBP..)? | yes = 1  
no = 2  
missing = 9 |
| Use_1  | Users/Usability | Are all languages (and dialects) relevant for SDI covered? | yes = 1  
no = 2  
missing=9 |
| Use_2  | Users/Usability | Is the SDI also in a foreign language | Yes completely=1  
Yes partly=2  
No=3  
Missing=9 |
| Use_3  | Users/Usability | Is the SDI based on a users requirements analysis? | Yes=1  
No=2  
Missing=9 |
| Use_4  | Users/Usability | What is the level of openness of the SDI? Access | Free access for all=1  
Free access Only for a user community=2  
Partially free |

<table>
<thead>
<tr>
<th>Sustainability</th>
<th>Sum of weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

| Use_2 | Users/Usability | Is the SDI also in a foreign language | Yes completely=1  
Yes partly=2  
No=3  
Missing=9 |
| Use_3  | Users/Usability | Is the SDI based on a users requirements analysis? | Yes=1  
No=2  
Missing=9 |
| Use_4  | Users/Usability | What is the level of openness of the SDI? Access | Free access for all=1  
Free access Only for a user community=2  
Partially free |
| Use_5 | Users/Usability | What is the level of openness of the SDI? Payment | Yes=1  
No=2  
Partially paying=3  
Not applicable missing=9 |
|-------|-----------------|-------------------------------------------------|----------------------------------|
| Use_6 | Users/Usability | Is the SDI targeted at public sector only, or also at private sector, Universities, Citizen? | Only public sector=1  
public and private sectors=2  
not applicable=8 |
| Use_7 | Users/Usability | Are the procedures to assess SDI usage and the user satisfaction? | Yes=1  
No=2  
Missing=9 |
| Use_8 | Users/Usability | Is there a service performance measurements (i.e number of accesses to service)? | Yes=1  
No=2  
Missing=9 |
| Users/Usability | Sum of weight |                                  | 10  
1  
1 |

Sum of weight
## Appendix III: Constraints-IDEC experience matrixes

<table>
<thead>
<tr>
<th>IDEC experiences CSF</th>
<th>General constraints</th>
<th>Specific constraints</th>
<th>General literature “how to” aspects</th>
<th>Local and sectorial considerations</th>
<th>organisational aspects</th>
<th>economical aspects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inadequate resources</td>
<td>Insufficient awareness, poor perception and lack of commitment</td>
<td>Lack of strategy</td>
<td>Inadequate IT and GIS skills and support</td>
<td>Technology and data problems</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General constraints</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inadequate IT and GIS skills and support</td>
<td>GIS not integrated into the decision-making culture</td>
<td>Not perceiving data as corporate resources</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specific constraints</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Insufficient staff number to implement and operate GIS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General literature “how to” aspects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Learn from other experiences</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Importance and encouraging of local entities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coordination and collaboration between the regional and local entities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sectorial approach</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Support of the SDI in the organisation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raise awareness on SDI benefits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>More partnerships</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital information available</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Focus on end users</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System engineering point of view</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consider project environment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>eGovernment funding: Open Balearic Association consortium</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Investment paid back in 6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constraints and IDEC experiences matrix</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IDEC experiences CSF</td>
<td>Most problematic ware</td>
<td>Orgware</td>
<td>Humanware</td>
<td>Infoware</td>
<td></td>
<td></td>
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<tr>
<td>---------------------</td>
<td>-----------------------</td>
<td>---------</td>
<td>-----------</td>
<td>----------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>General literature “how to” aspects</td>
<td>Learn from other experiences</td>
<td>Local and sectorial considerations</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Importance and encouraging of local entities</td>
<td>Coordination and collaboration between the regional and local entities</td>
<td>Sectorial approach</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Support of the SDI in the organisation</td>
<td>organisational aspects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raise awareness on SDI benefits</td>
<td>More partnerships</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital information available</td>
<td>System engineering point of view</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Focus on end users</td>
<td>Consider project environment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>System engineering point of view</td>
<td>economical aspects</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>eGovernment funding: Open Balearic Association consortium</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total investment paid back in 6 months</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Most problematic ware constraint IDEC experience matrix
Appendix IV - Partnerships and collaborations survey questions

**Q7a:** How would you rate the level of collaboration or cooperation of your local government with respect to data or resource sharing with the following organisations?

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Very Poor (1)</th>
<th>Poor (2)</th>
<th>Moderate (3)</th>
<th>Good (4)</th>
<th>Very Good (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Other local governments eg within a region of councils (ROCs)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>State government departments or agencies</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Commonwealth government agencies</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Non government organisations (NGOs) eg Landcare</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private sector organisations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Educational Institutions ie Universities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Your local government or municipal association</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Question**

**Q7d:** How do you rate the importance of the following *obstacles/barriers* to collaborating with *state government agencies* for data exchange/sharing?

<table>
<thead>
<tr>
<th>Obstacles/Barrier</th>
<th>Not important (1)</th>
<th>Limited Importance (2)</th>
<th>Moderate Importance (3)</th>
<th>Important (4)</th>
<th>Very Important (5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data sets being exchanged are not of equal value</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data standards</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of trust or goodwill</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lack of management or political support</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost/price of data</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Finding and accessing suitable data</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legal liability for Council</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copyright restrictions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Privacy of data</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time and effort required to establish agreements</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IT communication/ network infrastructure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other please specify</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix V: Case studies’ survey summary

1. What is your IDE?
IDEC
IDEIB
IDEmallorca
IDEmenorca

2. What law was signed the agreement creating the IDE?
IDEC: IDEC was born at the end of 2001, as a result of an agreement between the STSI and the ICC driven by the Catalan section of AESIG (today, the Catalan Association of Technology IG - ACTIG). At that time there was no specific law on the subject. In December 2005, the Law 16/2005 of the Parliament of Catalonia created the IDEC and its Support Centre, the latter as a unit of the ICC.
IDEIB: The realization of these tasks was approved by the Board of Directors in May 2007.
IDEmallorca: With none
IDEmenorca: There is no law or decree creating the IDE Menorca. There is only an agreement of collaboration between eight councils and the Island Council has as an objective the creation of the IDE Menorca.

3. What year was this SDI created?
IDEC: 2002
IDEIB: 2007
IDEmallorca: 2008
IDEmenorca: Technically we think we do not have an IDE. But the site works since August 2008

4. How would you rate the level of support that the SDI receives within the organisation?
IDEC: Good support
IDEIB: Good support
IDEmallorca: Limited support
IDEmenorca: Limited support

5. Do you think the Balearic Islands need any document similar to the white book of the GIS sector in Catalonia?
IDEC: No
IDEIB: Yes
IDEmallorca: Yes
IDEmenorca: Yes

6. What vision within the SDI hierarchy do you prefer for your SDI?
IDEC: top-down
IDEIB: bottom-up
IDEmallorca: top-down
IDEmenorca: bottom-up

7. At what stage of development is your SDI?
IDEC: Network
IDEIB: Network
IDEmallorca: Network
IDEmenorca: Exchange and standardization in the technical plan

8. At the present stage of development of your SDI sort from the most important (number 1) to the least important (number 4) the following organisational characteristics:

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership</td>
<td>C</td>
<td>IB,Me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A vision</td>
<td>C,Me</td>
<td>IB</td>
<td>Ma</td>
<td></td>
</tr>
<tr>
<td>Communication channels</td>
<td>IB</td>
<td>C</td>
<td>Ma</td>
<td>C</td>
</tr>
<tr>
<td>Self organisation</td>
<td>Ma</td>
<td>C</td>
<td>IB, Me</td>
<td></td>
</tr>
</tbody>
</table>

Legend: C = IDEC; IB=IDEIB; Ma=IDEmallorca; Me=IDEmenorca

9. Which organisations or departments does your SDI give support to?
IDEC: To many municipalities and county councils (apox. 400) that use the IDEC resources and specific applications within the framework of the IDEC. LOCAL initiative promoted by the AOC Consortium (Open Administration of Catalonia), using various tools Departments Platform Resources Geoinformation (PRG), and various agencies (STIS, Tourism, Localret,...)
IDEIB: All users and interested in all matters IDE and specially the administration of the Government of the Balearic Islands.
IDEmallorca: Technical support to no one
IDEmenorca: Generally CIME all departments and municipalities. But specially: - Planning, Environment, Agriculture, Historical, Planning (town).
10. Is the following organisational triangle correct for your organisation? If not correct please specify the error in the text box.

IDEC: No Response
IDEB: Yes
IDEmallorca: No Response
IDEmenorca: That is correct. Just add that the technical group or cartographic mapping and GIS Section as we say depends on the planning department.

11. What is the approximate annual budget of your SDI?

IDEC: 350,000€
IDEB: 150,000.00€
IDEmallorca: 20.000€
IDEmenorca: We have an allocated budget. Now they (2009-2010) have been given extra funding with a grant from the Ministry of Industry. One of the tasks is to appear in the current budget of the institution.

12. Who funds the SDI initiative?

IDEC: The budget is from the Department of Public Works, through the framework of the quatrienial agreement with the ICC
IDEB: The Government of the Balearic Islands
IDEmallorca: The Insular Council of Mallorca
IDEmenorca: Currently the CIME (40%) and Ministry of industry (60%). In the future they want to get funding from the CIME (approx 70%) and municipalities (30%). They have a vision of the IDEmenorca not like the SDI of the Council but of the local public institutions of Menorca.

13. In your organisation is the SDI staff the same as the GIS staff?

IDEC: No
IDEB: No
IDEmallorca: Yes
IDEmenorca: Yes

14. If question 13 is negative. What number of employees does the GIS unit have?

IDEC: 13
IDEB: 3

15. What is the total number of employees of the SDI unit?

IDEC: 4
IDEB: 4
IDEmallorca: 2
IDEmenorca: 1 in the CIME (Insular Council of Menorca) and 1 in silme (local computer service Menorca)

16. What number of employees are permanent at the SDI unit?

IDEC: 3
IDEB: 3
IDEmallorca: 0
IDEmenorca: 1

17. Identify which of the following qualifications poses the largest number of employees of the SDI:

IDEC: Postgraduate
IDEB: Graduate
IDEmallorca: Graduate and postgraduate
IDEmenorca: Professional formation, Graduate and Postgraduate

18. Which of the following functions exist in your SDI unit?

IDEC: All (SDI Manager, System support, database support, user support and production)
IDEB: SDI manager, System support and user support
IDEmallorca: All (SDI manager, System support, database support, user support and production)
IDEmenorca: SDI manager and System support

19. Staff within the organisational unit regularly has the opportunity to update their skills through seminars, conferences, short courses or formal education?

IDEC: Yes
IDEB: Yes
IDEmallorca: Yes
IDEmenorca: Yes

20. Is the SDI geoportal based on a user’s requirements analysis?
IDEC: No
IDEB: Yes
IDEmallorca: No
IDEmenorca: No

21. Are there procedures to assess SDI geoportal usage and the user’s satisfaction?
IDEC: Yes
IDEB: Yes
IDEmallorca: Yes
IDEmenorca: No Response

22. Is there a service performance measurement (i.e. number of accesses to services)?
IDEC: Yes
IDEB: Yes
IDEmallorca: Yes
IDEmenorca: Yes

23. How many partnerships with public and private organisations does your organisation have?
IDEC: We maintain informal agreements with the AOC Consortium, Localret, Civil Protection, Palau-Rubert (tourism) Universities of Catalonia, CREAF, CCCC, CREAF, GIS companies, Province of Barcelona, ..... 
IDEB: The IDEIB maintains partnerships with a few public organisations by the signing of agreements of the General Directorate of Territorial Administration with different administrations to share the cartography and to participate with the IDEIB. The existing partnerships are with the following organisations: Council of Mallorca, Council of Menorca, Council of Ibiza, Council of Formentera, University of the Balearic Islands and the Land Registry. Also, agreement proposals have been sent to all municipalities of the islands and have been signed with: Alcudia, Algaida, Bunyola, Calvia, Campanet, Costitx, Esportes Estellencs, Felanitx, Inca, Lloseta, Llucmajor, Mancor de la Vall, Marratx Puigpunyent, Sencelles and Salinas.
IDEmallorca: About 6
IDEmenorca: By convention: Council of Menorca, Consell Insular de Mallorca, Balearic Government. As we are at an early stage we have not yet worked in collaboration with private organisations.

24. How would you rate the level of collaboration or cooperation of your local/provincial/autonomous community SDI organisation with respect to data or resource sharing with the following organisations?

<table>
<thead>
<tr>
<th>Organisation</th>
<th>Poor (0-10)</th>
<th>Moderate (10-20)</th>
<th>Good (20-30)</th>
<th>Very Good (+30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Town halls</td>
<td>Ma</td>
<td>IB, Me</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Provincial or Island Councils</td>
<td></td>
<td></td>
<td>C, Me</td>
<td>IB, Ma</td>
</tr>
<tr>
<td>Autonomous Community organisations</td>
<td>C</td>
<td>IB, Me</td>
<td>Ma</td>
<td></td>
</tr>
<tr>
<td>State government departments or agencies</td>
<td>C, Me</td>
<td>IB, Ma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Educational Institutions i.e. Universities</td>
<td>Me</td>
<td></td>
<td>C, IB</td>
<td>Ma</td>
</tr>
<tr>
<td>Non government organisations e.g. Landcare</td>
<td>IB, Me</td>
<td></td>
<td>C, Ma</td>
<td></td>
</tr>
</tbody>
</table>

Legend: C = IDEC;  IB=IDEIB; Ma=IDEmallorca; Me=IDEmenorca

25. In general, have the partnerships or collaboration for sharing of data or resources resulted in:
IDEC: A major benefit to the other organisation
IDEB: A major benefit to the other organisation
IDEmallorca: A major benefit to the other organisation
IDEmenorca: Approximately the same benefit to both organisations

26. Which of the following components present more obstacles in your SDI?
IDEC: Orgware (support network of principles, practices and mechanisms that govern the effective use of Technoware)
IDEB: Infoware (Data, Metadata-accumulated knowledge required to perform the full potential of Technoware, human material and Orgware)
IDEmallorca: Orgware (support network of principles, practices and mechanisms that govern the effective use of Technoware)
**IDEmenorca:** Humanware (human capacity needed to realize the potential of Technoware)

27. Rate the following benefits and/or business drivers for your SDI initiative organisation in establishing data sharing/exchanging spatial data with other agencies:

<table>
<thead>
<tr>
<th>Benefit/Business Driver</th>
<th>Not Important</th>
<th>Important</th>
<th>Very Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved quality of data i.e. data matching and checking</td>
<td>Ma</td>
<td>C, IB</td>
<td>Me</td>
</tr>
<tr>
<td>Less duplication of effort and resources</td>
<td>C, Me</td>
<td>IB, Ma</td>
<td></td>
</tr>
<tr>
<td>Cost savings</td>
<td>IB, Me</td>
<td>C, Ma</td>
<td></td>
</tr>
<tr>
<td>Single authoritative source of data</td>
<td>C</td>
<td></td>
<td>IB, Me</td>
</tr>
<tr>
<td>Reduced request of data by other authorities</td>
<td>C</td>
<td>Ma, Me</td>
<td>IB</td>
</tr>
<tr>
<td>Improved service to rate payers</td>
<td>IB, Me</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>Better decision making</td>
<td>Me</td>
<td></td>
<td>C, IB, Ma</td>
</tr>
</tbody>
</table>

Legend: C = IDEC; IB = IDEIB; Ma = IDEMallorca; Me = IDEmenorca

28. What is the most common duration of collaborations with other organisations to share data or resources?
   - IDEC: Long term (permanent)
   - IDEIB: Long term (permanent)
   - IDEMallorca: Long term (up to 3 years)
   - IDEmenorca: Medium term (up to 3 years)

29. Does your organisation follow the model of the IDEC?
   - IDEC: No Response
   - IDEIB: Yes
   - IDEMallorca: No
   - IDEmenorca: No

30. Who are the main data providers of your SDI?
   - IDEC: ICC, Environment and Town Councils
   - IDEIB: Government Boards and Councils
   - IDEMallorca: Public Works Department, Dep. territory, Dep. Environment, Dep. Heritage
   - IDEmenorca: Balearic Government, and the same Consell Insular de Menorca.

31. Is there any data quality assessment in your SDI?
   - IDEC: No
   - IDEIB: Yes
   - IDEMallorca: Yes
   - IDEmenorca: Yes

32. If so, what does it include?
   - IDEC: No Response
   - IDEIB: Positional Accuracy, exactitude accuracy
   - IDEMallorca: Logical consistency, Integrity of objects
   - IDEmenorca: Logical consistency, Integrity of objects

33. Are time series available for the orthophotos of your SDI?
   - IDEC: Yes
   - IDEIB: Yes
   - IDEMallorca: No
   - IDEmenorca: No

34. In what languages are the accompanying data documents in?
   - IDEC: It's not a matter of the IDEC, but of each provider. But the metadata are in Catalan, Spanish and English.
   - IDEIB: English, German, Spanish, Catalan
   - IDEMallorca: Catalan
   - IDEmenorca: Catalan

35. Is the need to provide information in Spanish and Catalan a problem?
   - IDEC: No
   - IDEIB: No
   - IDEMallorca: No
   - IDEmenorca: No

36. In what languages are the geographical names managed?
   - IDEC: Catalan
   - IDEIB: Catalan
   - IDEMallorca: Catalan
   - IDEmenorca: Catalan
37. Is Metadata created and published by your organisation uncharged of the SDI?
IDEC: Yes
IDEIB: Yes
IDEmallorca: No
IDEmenorca: Yes

38. When did or when will the creation of metadata start?
IDEC: 2003
IDEIB: 2009
IDEmallorca: 2010
IDEmenorca: 2008

39. If your SDI does not yet have metadata. What is the reason?
IDEC: No Response
IDEIB: No Response
IDEmallorca: Lack of human resources
IDEmenorca: No Response

40. Is there any metadata catalogue?
IDEC: Yes
IDEIB: Yes
IDEmallorca: No
IDEmenorca: Yes

41. What year was or will the catalogue server is built?
IDEC: 2003
IDEIB: 2009
IDEmallorca: 2010
IDEmenorca: 2008

42. How much metadata is there in the catalogue?
IDEC: 30,000
IDEIB: 7,387 to four languages
IDEmallorca: No response
IDEmenorca: 699

43. How many registries of datasets are there?
IDEC: 100,000
IDEIB: No response
IDEmallorca: No response
IDEmenorca: 699

44. From how many organisations is there data?
IDEC: 150
IDEIB: 8
IDEmallorca: No response
IDEmenorca: CIME and councils

45. What metadata standards have been adopted or will be implement (ISO 10115, ISO 19139, ISO 15836: Dublin Core ...)?
IDEC: 19115-19139 ISO, ISO 19119
IDEIB: ISO 19139 NEM
IDEmallorca: ISO 19115
IDEmenorca: We have metadata but it doesn’t meet the standard. We are currently migrating the information to its own profile.

46. How do you rate the importance of these obstacles and barriers to data exchange?

<table>
<thead>
<tr>
<th>Obstacle/Barrier</th>
<th>Not important</th>
<th>Important</th>
<th>Very Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scattered data without control within and between organisations</td>
<td>IB</td>
<td>C, Ma, Me</td>
<td></td>
</tr>
<tr>
<td>Data without quality</td>
<td>C</td>
<td>IB, Me</td>
<td>Ma</td>
</tr>
<tr>
<td>SDI without standards</td>
<td>Me</td>
<td>IB, Ma</td>
<td>C</td>
</tr>
<tr>
<td>Poorly documented data</td>
<td>C, Ma, Me</td>
<td>IB</td>
<td></td>
</tr>
<tr>
<td>Lack of confidence or goodwill</td>
<td>IB</td>
<td>C, Ma, Me</td>
<td></td>
</tr>
<tr>
<td>Management or lack of political support</td>
<td>C, Ma, Me</td>
<td>IB</td>
<td></td>
</tr>
<tr>
<td>Cost, price of data</td>
<td>C, IB</td>
<td>Me</td>
<td>Ma</td>
</tr>
<tr>
<td>Find and access to appropriate data</td>
<td>C, IB, Ma</td>
<td></td>
<td>Me</td>
</tr>
<tr>
<td>Legal liability on the part of the organisation</td>
<td>C, IB, Me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Copyright restrictions</td>
<td>C, Ma</td>
<td>IB, Me</td>
<td></td>
</tr>
<tr>
<td>General constraint</td>
<td>General constraint answer</td>
<td>Specific constraint answer</td>
<td>Specific constraint</td>
</tr>
<tr>
<td>-------------------</td>
<td>--------------------------</td>
<td>---------------------------</td>
<td>---------------------</td>
</tr>
</tbody>
</table>
| Inadequate resources | IDEC, IDEmallorca, IDEmenorca | · Insufficient staff numbers to implement and operate GIS-IDEC  
· Inadequate financial resources resulting from both capital and revenues constraints, specially in smaller authorities |
| Insufficient awareness, poor perception and lack of commitment | IDEC, IDEmallorca | · Lack of top-level commitment  
· General lack of IT awareness and of GIS potential in particular  
· A bad experience from an earlier involvement  
· Failure to capture the imagination of politicians or lack of credibility of early GIS decision support systems or both  
· Skeptical or conservative perceptions of other stakeholders such as senior managers, staff, and citizens  
· Organisation instability resulting from changes in political control, local government reorganisation, or both |
| Lack of strategy | IDEmallorca | IDEIB | · No information strategy, leading to lack of vision, imagination and innovation  
· Lack of a business case  
· Neglect of human affairs-too technical emphasis  
· Lack of IT strategy resulting in an inadequate technical context within which GIS can be implemented and operated  
· No clear plan for implementing GIS  
· GIS not integrated into the decision-making culture |
| Inadequate IT and GIS skills and support | IDEC | IDEmallorca | · Responsibilities for IT and GIS support unclear  
· Lack of IT and GIS skills  
· Champions and pioneers moving on to another organisation  
· Enthusiasts providing answers to questions nobody may ask  
· Departmental barriers to effective communication  
· Personal decisions of staff that delay, and frustrate rather than help insufficient or inadequate |
<table>
<thead>
<tr>
<th>Technology and data problems</th>
<th>IDEIB</th>
<th>IDEmenorca</th>
<th>IDEIB</th>
<th>IDEmenorca</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tbody>
</table>

**48. Have you any other comments or suggestions?**

IDEC: No Response

IDEIB: No Response

IDEmallorca: No Response

IDEmenorca: Although both are closely related concepts (specially when the same people take care), IDEmenorca’s vision of the corporate GIS is separates from the SDI. The first offers internal service (local councils and the Council), it also deals with the production of data (there are three draughtsmen in the Council that do the local infrastructure survey amongs other tasks). The SDI provides an added-value for information, it diffuses it outside and looks for a feed-back. The concept of SDI as a network that circulates in all directions is important. In the near future the IDEmenorca will try to involve the private sector, professional associations, etc.
1. Quina es la seva IDE?
IDEC

2. Amb quina llei es va signar el conveni de creació de la seva IDE?
IDEC va neixer a finals del 2001, fruit d'un conveni entre la STSI i l'ICC impulsat per la secció catalana d'AESIG (avui en dia, Associació Catalana de Tecnologies de la IG - ACTIG). En aquell moment no hi havia cap llei específica sobre el tema. El desembre del 2005, la Llei 16/2005 del parlament de Catalunya creà la IDEC i el seu Centre de Suport, aquest darrer com a unitat de l'ICC.

3. Quin any es va crear aquesta IDE?
2002

4. Com qualificaria el nivell de suport que la unitat IDE rep dins de l'organització?
Bon suport

5. Creu que fa falta cap document paregut al llibre blanc del sector SIG a Catalunya a les Illes Balears?
No

6. Quina visió prefereix dins la jerarquia de les IDEs per la seva IDE?
Top-down (de dalt abaix) – nacional a local

7. En quina etapa de desenvolupament troba que esta la seva IDE?
Xarxa

8. En l'etapa actual de desenvolupament de la seva IDE ordeni de més important (numero 1) a menys (numero 4) les següents característiques organitzatives?

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lideratge</td>
<td>C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Una visió</td>
<td>C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canals de comunicació</td>
<td>C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capacitat d'autoorganització</td>
<td>C</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend: C= IDEC

9. A quins departaments o organizacions dona suport tècnic la seva IDE?
A multitud d'ajuntaments i consells comarcal (aprox. un 400) que utilitzen recursos de la IDEC i aplicacions específiques, dins el marc de la iniciativa IDEC.LOCAL promoguda pel Consorci AOC (Administració oberta de Catalunya), a diversos Departaments que utilitzen eines de la Plataforma de Recursos de Geoinformació (PRG), i a diversos organismes (STSI, Turisme, Localret,...)

10. Es correcte el següent triangle organitzatiu de la seva IDE? Si no es correcte si us plau especifiqui l’error al requadre de text.

Cap resposta

11. Quin és el pressupost anual aproximat de la seva IDE?
350.000 euros

12. Qui financia la seva iniciativa IDE?
El pressupost del Departament d'Obres Públiques, a traves de l'acord marc quatrienal que manté amb l'ICC

13. A la seva organització el personal de l’ unitat IDE es el mateix que el de l’ unitat SIG?
No

14. Si la qüestió 13 es negativa. Quin nombre d’ empleats hi ha a l’ unitat SIG?
13

15. Quin és el nombre total d’ empleats a l’ unitat IDE?
4

16. Quin nombre d’ empleats fixos hi ha a l’ unitat IDE?
3

17. Identifiqui quin dels següents títols acadèmics poseix el major nombre d’ empleats de l’IDE:
Postgrau
18. Quina de les següents funcions existeixen en la seva unitat IDE?
   Tots
19. El personal dins de la unitat IDE regularment té l’ oportunitat d’ actualitzar els seus coneixements a través de seminaris, conferències, cursos curts o d’ educació formal?
   Sí
20. El geoportal IDE d’ aquest node està basat en un anàlisi previ de requisits d’ usuaris?
   No
21. Existeixen procediments per avaluar l’ ús del seu geoportal IDE i la satisfacció de l’ usuaris?
   Sí
22. Hi ha un procediment per calcular el nombre d’ accessos als serveis de la seva IDE?
   Sí
23. Quantes col·laboracions amb organitzacions públiques i privades té la seva organització?
   Mantenim convenis i acords informals amb el Consorci AOC, Localret, Protecció Civil, Palau-Rubert (turisme), Universitats de Catalunya, Creaf, CCCC, Creaf, empreses SIG, Diputació de BCN, ...
24. Com qualificaria el nivell de col·laboració o cooperació (per número) de la seva IDE pel que fa a les dades o l’ intercanvi de recursos amb les següents organitzacions?

<table>
<thead>
<tr>
<th></th>
<th>Pobre (0-10)</th>
<th>Moderat (10-20)</th>
<th>Bo (20-30)</th>
<th>Molt bo (+30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ajuntaments</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consells provincials o insulares</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organitzacions de les Comunitats autònomes</td>
<td>C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ministeris o agencies de l’ Estat</td>
<td>C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Institucions educatives Universitats</td>
<td>C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organitzacions no governamentals</td>
<td></td>
<td>C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend: C= IDEC
25. En general, tenen les associacions o col·laboració de la seva IDE per a l’ intercanvi de dades o recursos com a resultat:
   Un major benefici per a l’ altra organització
26. Quin dels següents components presenten més obstacles en la seva IDE?
   Orgware (xarxa de suport dels principis, pràctiques i mecanismes que regeixen l’ús eficaç del Technoware)
27. Qualifiquiu, segons l’ importancia, els següents beneficis de la seva IDE en establir intercanvi de dades amb altres organitzacions:

<table>
<thead>
<tr>
<th></th>
<th>No Important</th>
<th>Important</th>
<th>Molt Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Millora de la qualitat de les dades</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Menys duplicació d’esforços i recursos</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estalvi de costos</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Una sola font autoritzada de dades</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reducció de sol·licitud de dades per altres autoritats</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Millora del servei als contribuents de tarifes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Millor presa de decisions</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend: C= IDEC
28. Quina és la durada més comuna de les col·laboracions amb altres organitzacions per a compartir dades o recursos de la seva IDE?
   Liarg termini (permanent)
29. La seva organització pren com a model a copiar l’ Infraestructura de Dades Geogràfiques de Catalunya?
   Cap resposta
30. Qui són els principals proveïdors de dades de la seva IDE?
   ICC, MediAmbient i Ajuntaments
31. A la seva IDE es fa qualca valuació de la qualitat de dades?
   No
32. En cas afirmatiu, què inclou?
33. A la seva IDE tenen sèries de temps disponible per a ortofotos?
Sí

34. En quins idiomes són proveïts els documents d' acompanyament de dades?
No és unaquestió de la IDEC, sino de cada proveïdor. Pero les metadades estan en català, castellà i anglès.

35. És la necessitat de proporcionar informació en castellà i català un problema?
No

36. En quins idiomes estan gestionats els nous geogràfics?
Català

37. Hi ha metadades creades i publicades per la vostra organització encarregada de l' IDE?
Sí

38. Quin any es va iniciar o quin any es pretén iniciar la creació de metadades?
2003

39. Si la seva IDE encara no té metadades. Quin és el motiu?
Cap resposta

40. Existeix un catàleg de metadades a la seva IDE?
Sí

41. Quin any es va iniciar o quin any es pretén iniciar la creació del catàleg de metadades?
2003

42. Quantes metadades hi ha al catàleg?
30.000

43. Quants registres de bases de dades hi ha?
100.000

44. De quantes organitzacions hi ha dades?
150

45. Quins estàndards de metadades s' han adoptat o s' implementaran (ISO 10115, ISO 19139, ISO 15836:Dublin Core...)?
ISO 19115-19139, ISO 19119

46. Com valora vostè la importància dels següents obstacles i barreres per a l'intercanvi de dades ?

<table>
<thead>
<tr>
<th>Obstacle/Barrier</th>
<th>Indifferent</th>
<th>Important</th>
<th>Molt Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dades disperses sense control dins i entre organitzacions</td>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td>Dades sense qualitat</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IDE sense standards</td>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td>Dades mal documentades</td>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td>Manca de confiança o de bona voluntat</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manca de gestió o de suport polític</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost, preu de les dades</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cerca i access a les dades adequats</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Responsabilitat legal per part de l' organització</td>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td>Restriccions de Dret d'Autor</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Privacitat de dades</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temps i esforç necessaris per establir acords</td>
<td></td>
<td></td>
<td>C</td>
</tr>
<tr>
<td>Comunicació d' informació tecnològica / xarxa d'infraestructures</td>
<td>C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incapacitat de trobar solucions per als problemes de les IDEs</td>
<td>C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend: C= IDEC

47. Quins dels aspectes de la llista han limitat l' expansió de la seva iniciativa IDE?
Manca de personal per implementar i operar el SIG
Insuficient sensibilització, percepció deficient i manca de compromise
SIG no integrats en la cultura de presa de decisions
Barreres departamentals de comunicacions efectiva

48. Té qualsevol altre comentari o suggeriment?
Cap resposta
Appendix VII: IDEIB survey

1. Quina es la seva IDE?
IDEIB

2. Amb quina llei es va signar el conveni de creació de la seva IDE?
La realització d’aquestes tasques es va aprovar en el Consell d’Administració del mes de maig de 2007.

3. Quin any es va crear aquesta IDE?
2007

4. Com qualificaria el nivell de suport que la unitat IDE rep dins de l’organització?
Bon suport

5. Creu que fa falta cap document paregut al llibre blanc del sector SIG a Catalunya a les Illes Balears?
Sí

6. Quina visió prefereix dins la jerarquia de les IDEs per la seva IDE?
Bottom-up (de baix cap dalt) –local a nacional

7. En quina etapa de desenvolupament troba que esta la seva IDE?
Xarxa

8. En l’etapa actual de desenvolupament de la seva IDE ordeni de més important (numero 1) a menys (numero 4) les següents característiques organitzatives?

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
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</tr>
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<td>Lideratge</td>
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<tr>
<td>Capacitat d’autoorganització</td>
<td>IB</td>
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<td></td>
</tr>
</tbody>
</table>

1. Legenda: IB= IDEIB

9. A quins departaments o organitzacions dona suport tècnic la seva IDE?
A tots els usuaris i interessats en les qüestions IDE i especialment a tota l’administració del Govern de les Illes Balears.

10. Es correcte el següent triangle organitzatiu de la seva IDE? Si no es correcte si us plau especifiqui l’error al requadre de text.


Si

11. Quin és el pressupost anual aproximat de la seva IDE?
150.000,00€ any

12. Qui finançia la seva iniciativa IDE?
EL Govern de les Illes Balears

13. A la seva organització el personal de l’unitat IDE es el mateix que el de l’unitat SIG?
No

14. Si la qüestió 13 es negativa. Quin nombre d’empleats hi ha a l’unitat SIG?
3

15. Quin és el nombre total d’empleats a l’unitat IDE?
4

16. Quin nombre d’empleats fixos hi ha a l’unitat IDE?
3

17. Identifiqui quin dels següents títols acadèmics poseix el major nombre d’empleats de l’IDE:
Llicenciatura

18. Quina de les següents funcions existeixen en la seva unitat IDE?
Gestor IDE
Sistema de suport
Assistència a l’ usuari

19. El personal dins de la unitat IDE regularment té l’ oportunitat d’ actualitzar els seus coneixements a través de seminaris, conferències, cursos curts o d’ educació formal?
Sí

20. El geoportal IDE d’ aquest node esta basat en un anàlisis previ de requisits d’ usuari?
Sí

21. Existeixen procediments per avaluar l’ ús del seu geoportal IDE i la satisfacció de l’ usuari?
Sí

22. Hi ha un procediment per calcular el nombre d’ accessos als serveis de la seva IDE?
Sí

23. Quantes col•laboracions amb organitzacions publiques i privades té la seva organització?
Mitjançant la signatura de convenis PER PART DE LA DIRECCIÓ GENERAL D’ORDENACIÓ DEL TERRITORI amb diferents administracions per compartir la cartografia i participar conjuntament en la IDEIB. Amb el Consell de Mallorca. Amb el Consell de Menorca. Amb el Consell d’Eivissa. Amb el Consell de Formentera. Amb la UIB. Amb el Registre de la Propietat. S’han enviat propostes de convenis a tots els ajuntaments de les Illes, i s’ha signat amb: Alcúdia,Alcúdia,Bunyola,Calvià,Campanet,Costitx,Esporles,Estellencs,Felanitx,Inca,Lloseta,Llucmajor,Mancor de la Vall,Marratxí,Puigpunyent,Sencelles,Ses Salines.

24. Quina és la durada més comuna de les col•laboracions amb altres organitzacions per a compartir dades o recursos?
Llarg termini (permanent)

25. Quina és la durada més comuna de les col•laboracions amb altres organitzacions per a compartir dades o recursos?
Llarg termini (permanent)

26. Què són els principals proveïdors de dades de la seva IDE?
Govern, Conselles i Ajuntaments

27. Qualifiqui, segons l’ importancia, els següents beneficiis de la seva IDE en establir intercanvi de dades amb altres organitzacions:

<table>
<thead>
<tr>
<th>Benefici</th>
<th>No Important</th>
<th>Important</th>
<th>Molt Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Millora de la qualitat de les dades</td>
<td>IB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Menys duplicació d’esforços i recursos</td>
<td></td>
<td>IB</td>
<td></td>
</tr>
<tr>
<td>Estalvi de costos</td>
<td></td>
<td>IB</td>
<td></td>
</tr>
<tr>
<td>Una sola font autoritzada de dades</td>
<td></td>
<td></td>
<td>IB</td>
</tr>
<tr>
<td>Reducció de sol·licitud de dades per altres autoritats</td>
<td></td>
<td>IB</td>
<td></td>
</tr>
<tr>
<td>Millora del servei als contribuents de tarifes</td>
<td>IB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Millor presa de decisions</td>
<td></td>
<td></td>
<td>IB</td>
</tr>
</tbody>
</table>

28. Quina és la durada més comuna de les col•laboracions amb altres organitzacions per a compartir dades o recursos de la seva IDE?
Llarg termini (permanent)

29. La seva organització pren com a model a copiar l’ Infraestructura de Dades Geogràfiques de Catalunya?
Sí
Sí
32. En cas afirmatiu, què inclou?
Exactitud posicional
Precisió posicional
33. A la seva IDE tenen sèries de temps disponible per a ortofotos?
Sí
34. En quins idiomes són proveïts els documents d’ acompanyament de dades?
Anglès, Alemany, Català, Castellà
35. És la necessitat de proporcionar informació en castellà i català un problema?
No
36. En quins idiomes estan gestionats els noms geogràfics?
Català
37. Hi ha metadades creades i publicades per la vostra organització encarregada de l’ IDE?
Sí
38. Quin any es va iniciar o quin any es pretén iniciar la creació de metadades?
2009
39. Si la seva IDE encara no té metadades. Quin és el motiu?
No Response
40. Existeix un catàleg de metadades a la seva IDE?
Sí
41. Quin any es va iniciar o quin any es pretén iniciar la creació del catàleg de metadades?
2009
42. Quantes metadades hi ha al catàleg?
7.387 per quatre idiomes
43. Quants registres de bases de dades hi ha?
Cap resposta
44. De quants organitzacions hi ha dades?
8
45. Quins estàndards de metadades s’ han adoptat o s’ implementaran (ISO 10115, ISO 19139, ISO 15836:Dublin Core...)?
ISO 10115
46. Com valora vostè la importància dels següents obstacles i barreres per a l'intercanvi de dades?

<table>
<thead>
<tr>
<th>Obstacle</th>
<th>Indiferent</th>
<th>Important</th>
<th>Molt Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dades disperses sense control dins i entre organitzacions</td>
<td></td>
<td></td>
<td>IB</td>
</tr>
<tr>
<td>Dades sense qualitat</td>
<td></td>
<td></td>
<td>IB</td>
</tr>
<tr>
<td>IDE sense standards</td>
<td></td>
<td></td>
<td>IB</td>
</tr>
<tr>
<td>Dades mal documentades</td>
<td></td>
<td></td>
<td>IB</td>
</tr>
<tr>
<td>Manca de confiança o de bona voluntat</td>
<td>IB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manca de gestió o de suport polític</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost, preu de les dades</td>
<td></td>
<td></td>
<td>IB</td>
</tr>
<tr>
<td>Cerca i access a les dades adequats</td>
<td></td>
<td></td>
<td>IB</td>
</tr>
<tr>
<td>Responsabilitat legal per part de l’ organització</td>
<td></td>
<td></td>
<td>IB</td>
</tr>
<tr>
<td>Restriccions de Dret d’Autor</td>
<td></td>
<td></td>
<td>IB</td>
</tr>
<tr>
<td>Privacitat de dades</td>
<td></td>
<td></td>
<td>IB</td>
</tr>
<tr>
<td>Temps i esforç necessaris per establir accords</td>
<td></td>
<td></td>
<td>IB</td>
</tr>
<tr>
<td>Comunicació d’ informació tecnològica / xarxa d'infraestructures</td>
<td></td>
<td></td>
<td>IB</td>
</tr>
<tr>
<td>Incapacitat de trobar solucions per als problemes de les IDEs</td>
<td></td>
<td></td>
<td>IB</td>
</tr>
</tbody>
</table>

\[I.Legaenda: IB= IDEIB\]
47. Quins dels aspectes de la llista han limitat l’ expansió de la seva iniciativa IDE?
Cap estratègia d’ informació, el que porta a la manca de visió, imaginació i innovació
Tecnologia i problemes de dades
No hi ha normes per les dades
48. Té qualsevol altre comentari o suggeriment?
Cap resposta
APPENDIX VIII:IDEmallorca survey

1. Quina es la seva IDE?
IDEmallorca

2. Amb quina llei es va signar el conveni de creació de la seva IDE?
Amb cap

3. Quin any es va crear aquesta IDE?
2008

4. Com qualificaria el nivell de suport que la unitat IDE rep dins de l’organització?
Suport limitat

5. Creu que fa falta cap document paregut al llibre blanc del sector SIG a Catalunya a les Illes Balears?
Sí

6. Quina visió prefereix dins la jerarquia de les IDEs per la seva IDE?
Top-down (de dalt abaix) –nacional a local

7. En quina etapa de desenvolupament troba que està la seva IDE?
Xarxa

8. En l’etapa actual de desenvolupament de la seva IDE ordeni de més important (numero 1) a menys (numero 4) les següents característiques organitzatives?

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lideratge</td>
<td>Ma</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Una visió</td>
<td>Ma</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Canals de comunicació</td>
<td>Ma</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capacitat d’autoorganització</td>
<td>Ma</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**LLegenda:** Ma= IDEmallorca

9. A quins departaments o organitzacions dona suport tècnic la seva IDE?
Suport tècnic a ningú

10. Es correcte el següent triangle organitzatiu de la seva IDE? Si no es correcte si us plau especifiqui l’error al requadre de text.


No Response

11. Quin és el pressupost anual aproximat de la seva IDE?
20.000 €

12. Qui financia la seva iniciativa IDE?
Consell de Mallorca

13. A la seva organització el personal de l’ unitat IDE es el mateix que el de l’ unitat SIG?
Sí

14. Si la qüestió 13 es negativa. Quin nombre d’ empleats hi ha a l’ unitat SIG?
No Response

15. Quin és el nombre total d’ empleats a l’ unitat IDE?
2

16. Quin nombre d’ empleats fixos hi ha a l’ unitat IDE?
0

17. Identifiqui quin dels següents títols acadèmics poseix el major nombre d’ empleats de l’ IDE:
Licenciatura
Postgrau

18. Quina de les següents funcions existeixen en la seva unitat IDE?
Tots

19. El personal dins de la unitat IDE regularment té l’ oportunitat d’ actualitzar els seus coneixements a través de seminaris, conferències, cursos curts o d’ educació formal?
Sí
20. El geoportal IDE d’ aquest node esta basat en un anàlisis previ de requisits d’ usuari?
No
21. Existeixen procediments per avaluar l’ úss del seu geoportal IDE i la satisfacció de l’ usuari?
Sí
22. Hi ha un procediment per calcular el nombre d’ accessos als serveis de la seva IDE?
Sí
23. Quantes col·laboracions amb organitzacions públiques i privades té la seva organització?
Unes 6
24. Com qualificaria el nivell de col·laboració o cooperació (per número) de la seva IDE pel que fa a les dades o l’ intercanvi de recursos amb les següents organitzacions?

<table>
<thead>
<tr>
<th></th>
<th>Pobre (0-10)</th>
<th>Moderat (10-20)</th>
<th>Bo (20-30)</th>
<th>Molt bo (+30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ajuntaments</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Consells provincials o insulars</td>
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<tr>
<td>Organitzacions de les Comunitats autonomies</td>
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<td></td>
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<tr>
<td>Ministeris o agencies de l' Estat</td>
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<tr>
<td>Universitats</td>
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</tr>
<tr>
<td>Organitzacions no governamentals</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Legend: Ma = IDEmallorca

25. En general, tenen les associacions o col·laboració de la seva IDE per a l’ intercanvi de dades o recursos com a resultat:
Major benefici per a la seva organització
26. Quin dels següents components presenten més obstacles en la seva IDE?
Orgware (xarxa de suport dels principis, pràctiques i mecanismes que regeixen l’ús eficaç del Technoware)
27. Qualifiqui, segons l’ importancia, els següents beneficis de la seva IDE en establir intercanvi de dades amb altres organismes:

<table>
<thead>
<tr>
<th></th>
<th>No Important</th>
<th>Important</th>
<th>Molt Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Millora de la qualitat de les dades</td>
<td>Ma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Menys duplicació d'esforços i recursos</td>
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<td></td>
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<tr>
<td>Estalvi de costos</td>
<td>Ma</td>
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<tr>
<td>Reduccion de sol·licitud de dades per altres autoritats</td>
<td>Ma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Millora del servei als contribuents de tarifes</td>
<td></td>
<td>Ma</td>
<td></td>
</tr>
<tr>
<td>Millor presa de decisions</td>
<td>Ma</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. Legend: Ma = IDEmallorca

28. Quina és la durada més comuna de les col·laboracions amb altres organitzacions per a compartir dades o recursos de la seva IDE?
Llarg termini (permanent)
29. La seva organització pren com a model a copiar l’ Infraestructura de Dades Geogràfiques de Catalunya?
No
30. Qui són els principals proveïdors de dades de la seva IDE?
Departament d’Obres Públiques, Dep. territori, Dep. Medi Ambient, Dep. Patrimoni
31. A la seva IDE es fa qualca avaluació de la qualitat de dades?
Sí
32. En cas afirmatiu, què inclou?
Consistència lògica
Integritat dels objectes
33. A la seva IDE tenen sèries de temps disponible per a ortofotos?
No
34. En quins idiomes són proveïts els documents d’ acompanyament de dades?
35. És la necessitat de proporcionar informació en castellà i català un problema?
No
36. En quins idiomes estan gestionats els noms geogràfics?
Català
37. Hi ha metadades creades i publicades per la vostra organització encarregada de l' IDE?
No
38. Quin any es va iniciar o quin any es pretén iniciar la creació de metadades?
2010
39. Si la seva IDE encara no té metadades. Quin es el motiu?
Manca de recursos humans
40. Existeix un catàleg de metadades a la seva IDE?
No
41. Quin any es va iniciar o quin any es pretén iniciar la creació del catàleg de metadades?
2010
42. Quantes metadades hi ha al catàleg?
Cap resposta
43. Quants registres de bases de dades hi ha?
Cap resposta
44. De quantes organitzacions hi ha dades?
Cap resposta
45. Quins estàndards de metadades s' han adoptat o s' implementaran (ISO 10115, ISO 19139, ISO 15836:Dublin Core...)?
ISO 19139 NEM
46. Com valora vostè la importància dels següents obstacles i barreres per a l'intercanvi de dades?

<table>
<thead>
<tr>
<th>Obstacle</th>
<th>Indiferent</th>
<th>Important</th>
<th>Molt Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dades disperses sense control dins i entre organitzacions</td>
<td></td>
<td>Ma</td>
<td></td>
</tr>
<tr>
<td>Dades sense qualitat</td>
<td></td>
<td>Ma</td>
<td></td>
</tr>
<tr>
<td>IDE sense standards</td>
<td></td>
<td>Ma</td>
<td></td>
</tr>
<tr>
<td>Dades mal documentades</td>
<td></td>
<td>Ma</td>
<td></td>
</tr>
<tr>
<td>Manca de confiança o de bona voluntat</td>
<td></td>
<td>Ma</td>
<td></td>
</tr>
<tr>
<td>Manca de gestió o de suport polític</td>
<td></td>
<td>Ma</td>
<td></td>
</tr>
<tr>
<td>Cost, preu de les dades</td>
<td></td>
<td>Ma</td>
<td></td>
</tr>
<tr>
<td>Cerca i access a les dades adequats</td>
<td></td>
<td>Ma</td>
<td></td>
</tr>
<tr>
<td>Responsabilitat legal per part de l' organització</td>
<td></td>
<td>Ma</td>
<td></td>
</tr>
<tr>
<td>Restriccions de Dret d'Autor</td>
<td></td>
<td>Ma</td>
<td></td>
</tr>
<tr>
<td>Privacitat de dades</td>
<td></td>
<td>Ma</td>
<td></td>
</tr>
<tr>
<td>Temps i esforç necessaris per establir accords</td>
<td></td>
<td>Ma</td>
<td></td>
</tr>
<tr>
<td>Comunicació d' informació tecnològica / xarxa d'infraestructures</td>
<td></td>
<td>Ma</td>
<td></td>
</tr>
<tr>
<td>Incapacitat de trobar solucions per als problemes de les IDEs</td>
<td></td>
<td>Ma</td>
<td></td>
</tr>
</tbody>
</table>

Legenda: Ma= IDEmallorca

47. Quins dels aspectes de la llista han limitat l' expansió de la seva iniciativa IDE?
Insuficiència de recursos
Manca de personal per implementar i operar el SIG
Insufficient sensibilització, percepció deficient i manca de compromís
Manca d’ estratègia
SIG no integrats en la cultura de presa de decisions
Insufficient o inadequada capacitació dels usuaris
Falta de percepció de les dades com un recurs corporatiu

48. Té qualsevol altre comentari o suggeriment?
Cap resposta
Appendix IX: IDEmenorca survey

1. Quina es la seva IDE?
IDEmenorca

2. Amb quina llei es va signar el conveni de creació de la seva IDE?
No hi ha cap llei ni decret de creació de la IDE Menorca. Només hi ha un conveni de col·laboració entre els vuit ajuntaments i el Consell Insular que té com un dels objectius la creació de la IDE Menorca.

3. Quin any es va crear aquesta IDE?
Tècnicament nosaltres considerem que no tenim una IDE encara. Però la web funciona des d'agost de 2008

4. Com qualificaria el nivell de suport que la unitat IDE rep dins de l'organització?
Suport limitat

5. Creu que fa falta cap document paregut al llibre blanc del sector SIG a Catalunya a les Illes Balears?
Sí

6. Quina visió prefereix dins la jerarquia de les IDEs per la seva IDE?
Bottom-up (de baix cap dalt) –local a nacional

7. En quina etapa de desenvolupament troba que està la seva IDE?
Intercanvi i normalització en el pla tècnic

8. En l’etapa actual de desenvolupament de la seva IDE ordeni de més important (numero 1) a menys (numero 4) les següents característiques organitzatives?

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lideratge</td>
<td></td>
<td>Me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Una visió</td>
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<td></td>
<td>Me</td>
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<tr>
<td>Canals de comunicació</td>
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<td>Me</td>
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<tr>
<td>Capacitat d'autoorganització</td>
<td></td>
<td></td>
<td></td>
<td>Me</td>
</tr>
</tbody>
</table>

I.Legenda: Me= IDEmenorca

9. A quins departaments o organitzacions dona suport tècnic la seva IDE?
De manera general a tots els departaments del CIMe i Ajuntaments. Però especialment a: - Ordenació del Territori, Medi Ambient, Agricultura, Patrimoni històric, Urbanisme (ajuntaments).

10. Es correcte el següent triangle organitzatiu de la seva IDE? Si no es correcte si us plau especifiquei l’error al requadre de text.
És correcte. Només matissar que el grup tècnic cartogràfic o Secció de cartografia i SIG com en diem nosaltres depèn del departament d'ordenació del territori.

11. Quin és el pressupost anual aproximat de la seva IDE?

12. Qui finança la seva iniciativa IDE?
Actualment el CIME (40%) i Ministeri d’industry (60%). En el futur ens plantejem aconseguir un finançament entre el CIME (70% aprox) i ajuntaments (30 %). Visualitzem el node IDE menorca no com la IDE del Cime sinó com la IDE de les institucions públiques locals de Menorca.

13. A la seva organització el personal de l’unitat IDE es el mateix que el de l’unitat SIG?
Sí

14. Si la qüestió 13 es negativa. Quin nombre d’empleats hi ha a l’unitat SIG?
No Response

15. Quin és el nombre total d’empleats a l’unitat IDE?
1 (al cime) i 1 a SILME (servei informàtica local de Menorca)

16. Quin nombre d’empleats fixos ha a l’unitat IDE?
1

17. Identifiqui quin dels següents títols acadèmics poseix el major nombre d’empleats de l’
IDE:
Diplomatura
Licenciatura
Postgrau
18. Quina de les següents funcions existeixen en la seva unitat IDE?
Gestor IDE
Sistema de suport
19. El personal dins de la unitat IDE regularment té l’ oportunitat d’ actualitzar els seus coneixements a través de seminaris, conferències, cursos curts o d’ educació formal?
Sí
20. El geoportal IDE d’ aquest node està basat en un anàlisis previ de requisits d’ usuari?
No
21. Existeixen procediments per avaluar l’ ús del seu geoportal IDE i la satisfacció de l’ usuari?
Cap resposta
22. Hi ha un procediment per calcular el nombre d’ accessos als serveis de la seva IDE?
Sí
23. Quantes col·laboracions amb organitzacions publiques i privades té la seva organització?
Mitjançant conveni: Ajuntaments de Menorca. Consell Insular de Mallorca. Govern Balear Donat que estem en una fase inicial no hem treballat encara les col·laboracions amb organitzacions privades.
24. Com qualificaria el nivell de col·laboració o cooperació (per número) de la seva IDE pel que fa a les dades o l’ intercanvi de recursos amb les següents organitzacions?

<table>
<thead>
<tr>
<th>Organitzacions</th>
<th>Pobre (0-10)</th>
<th>Moderat (10-20)</th>
<th>Bo (20-30)</th>
<th>Molt bo (+30)</th>
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<tr>
<td>Consells provincials o insulars</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organitzacions de les Comunitats autònomes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ministeris o agencies de l’ Estat</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Institucions educatives Universitats</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organitzacions no governamentals</td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

LLelegenda: Me= IDEmenorca

25. En general, tenen les associacions o col·laboració de la seva IDE per a l’ intercanvi de dades o recursos com a resultat?
Aproximadament el mateix benefici per a ambdues organitzacions
26. Quin dels següents components presenten més obstacles en la seva IDE?
Humanware (capacitat humana necessària per realitzar el potencial d’Technoware)
27. Qualifiqui, segons l’ importancia, els següents beneficis de la seva IDE en establir intercanvi de dades amb altres organismes:

<table>
<thead>
<tr>
<th>Beneficis</th>
<th>No Important</th>
<th>Important</th>
<th>Molt Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Millora de la qualitat de les dades</td>
<td></td>
<td>Me</td>
<td></td>
</tr>
<tr>
<td>Menys duplicació d’esforços i recursos</td>
<td>Me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estalvi de costos</td>
<td>Me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Una sola font autoritzada de dades</td>
<td></td>
<td>Me</td>
<td></td>
</tr>
<tr>
<td>Reducció de sol·licitud de dades per altres autoritats</td>
<td>Me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Millora del servei als contribuents de tarifes</td>
<td>Me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Millor presa de decisions</td>
<td>Me</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

LLelegenda: Me= IDEmenorca
28. Quina és la durada més comuna de les col·laboracions amb altres organitzacions per a compartir dades o recursos de la seva IDE?
Mitjà termini (fins a 3 anys)
29. La seva organització pren com a model a copiar l’ Infraestructura de Dades Geogràfiques de Catalunya?
No
30. Qui són els principals proveïdors de dades de la seva IDE?
Govern Balear, i el mateix Consell Insular de Menorca.

31. A la seva IDE es fa qualca avaluació de la qualitat de dades?
Sí

32. En cas afirmatiu, què inclou?
Consistència lògica
Integritat dels objectes

33. A la seva IDE tenen sèries de temps disponible per a ortofotos?
No

34. En quins idiomes són proveïts els documents d’ acompanyament de dades?
Català

35. És la necessitat de proporcionar informació en castellà i català un problema?
No

36. En quins idiomes estan gestionats els noms geogràfics?
Català

37. Hi ha metadades creades i publicades per la vostra organització encarregada de l' IDE?
Sí

38. Quin any es va iniciar o quin any es pretén iniciar la creació de metadades?
2008

39. Si la seva IDE encara no té metadades. Quin és el motiu?
No Response

40. Existeix un catàleg de metadades a la seva IDE?
Sí

41. Quin any es va iniciar o quin any es pretén iniciar la creació del catàleg de metadades?
2008

42. Quants metadades hi ha al catàleg?
699

43. Quants registres de bases de dades hi ha?
699

44. De quantes organitzacions hi ha dades?
CIME i ajuntaments

45. Quins estàndards de metadades s’ han adoptat o s’ implementaran (ISO 10115, ISO 19139, ISO 15836:Dublin Core...)?
Tenim metadades però no compleixen l'estàndard. En aquests moments estem migrant la informació a un perfil propi.

46. Com valora vostè la importància dels següents obstacles i barreres per a l'intercanvi de dades ?

<table>
<thead>
<tr>
<th>Obstacle</th>
<th>Indiferent</th>
<th>Important</th>
<th>Molt Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dades disperses sense control dins i entre organitzacions</td>
<td></td>
<td></td>
<td>Me</td>
</tr>
<tr>
<td>Dades sense qualitat</td>
<td>Me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IDE sense standards</td>
<td>Me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dades mal documentades</td>
<td>Me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manca de confiança o de bona voluntat</td>
<td>Me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manca de gestió o de suport polític</td>
<td>Me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost, preu de les dades</td>
<td>Me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cerca i access a les dades adequats</td>
<td></td>
<td>Me</td>
<td></td>
</tr>
<tr>
<td>Responsabilitat legal per part de l’ organitzaci</td>
<td>Me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restriccions de Dret d’Autor</td>
<td>Me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Privacitat de dades</td>
<td>Me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Temps i esforç necessaris per establir accords</td>
<td>Me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comunicació d’ informació tecnològica / xarxa d'infraestructures</td>
<td>Me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Incapacitat de trobar solucions per als problemes de les IDEs</td>
<td>Me</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Legend: Me= IDEmenorca
47. Quins dels aspectes de la llista han limitat l’ expansió de la seva iniciativa IDE?
Insuficiència de recursos
Manca de personal per implementar i operar el SIG
Experiència dolenta d’ un SIG anterior
Negligència dels assumptes humans-massa èmfasi tècnica
Inadequada maquinaria (hardware i software)
Falta de percepció de les dades com un recurs corporatiu

48. Té qualsevol altre comentari o suggeriment?
Malgrat son dos coneptes estretament relacionat (més encara quan les mateixes persones se n'ocupen), la nostra visió separa el SIG corporatiu de la IDE. El primer ofereix servei intern (ajuntaments i Consell), s'ocupa també de la producció de les dades (hi ha tres delinieants a l'equip que depuren carrerer, fan la EIEL entre d'altres tasques de producció). La IDE dóna valor afegit a la informació, la difon cap a l'exterior i alhora cerquem que hi hagi un feed-back. El concepte de IDE com a xarxa que circula en totes direccions és important. En un futur proper mirarem d'implicar el sector privat, col·legis professionals, etc en la IDE Menorca.