

INDUSTRIAL GEOGRAPHICAL INFORMATION SYSTEMS (GISS): A TOOL FOR MANAGING AND PROMOTING INDUSTRY. CASE STUDY: ÁLAVA (BASQUE COUNTRY, SPAIN)

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I. INTRODUCTION

Throughout the industrialized world, industry and industrial areas have been undergoing an important transformation. The use of Geographical Information systems (GISs) and all their associated technology have allowed improved efficiency in the management of industrial space (and, by extension, of other areas as well). Additionally, the use of industrial GISs has also created competitive advantages, for promoting industry.

Because of this, in 2010, in the Basque Province of Álava, a GIS was created on the geoportal website, *alavamap.es*, containing information about all the industrial spaces and businesses in this area. We believe now is a good time to evaluate this information system tool and suggest a number of improvements. This article describes the industrial GIS *alavamap.es*, and presents our proposed improvements. This analysis is the result of interviews with different people involved in Álava's industrial sector.

II. INDUSTRIAL ACTIVITY IN A CONTEXT OF CHANGE: AN OVERVIEW

In the last few decades, industrial zones and their associated businesses have seen an important structural change. This transformation is mainly due to two interrelated processes that have accompanied a new, more flexible production model. First, the technological

revolution, based on information and communication technologies (ICT), has been the basis of restructuring production. Manufacturing has moved away from *Fordism* to a newer model, *Flexible Specialization*. Second, the creation of a global economy has meant a restructuring of economic processes on a planetary level. Finally, related to the technological advances and the emergence of the global economy, we have begun to see an economy based on innovation and knowledge. This new economy is becoming the key to better efficiency and productivity, and a strategic and differentiating factor in the uneven economic development in the industrialized world.

These three factors have propelled a profound transformation in industrial areas. The most dynamic sectors have been those linked to the new technologies, and more recently, those connected to creative and cultural activities.

Nowadays, industrial zones increasingly need to be located near urban areas, to take advantage of high-quality services and environmental factors, thus advancing an industrial sector whose businesses are increasingly diversified and less involved in actual manufacturing.

III. INDUSTRIAL GIS APPLICATIONS AND EXPERIENCES: GENERAL REMARKS

A tool such as the industrial GIS presented here can be used in four main ways. It can

- 1) put policies into place to promote industry
- 2) act as an information system to monitor and inspect industrial spaces and activities
- 3) manage day-to-day industrial activities
- 4) serve as an information system to be used by the businesses themselves.

Throughout Spain, many administrative bureaus—at the national, regional and local levels—have been launching projects to inform the populace about industrial zones. At the national level, there is a project run by the Spanish Federation of Municipalities and Provinces (FEMP) and the Spanish Coordinator of Industry (CEPE). Their goal is to create a tool that can offer information about all the industrial parks of Spain. Unfortunately, Spain's current economic crisis has slowed down the execution of this project, and so far only the data from a few industrial sites has been collected. Likewise, the Spanish autonomous regions have implemented search engines to locate industrial space. And, finally, on the local level, applications are available that offer the citizenry information about available industrial land.

However, very few of these initiatives offer information about the businesses within each area, and the majority functions only as a means to find available lots for new businesses. The majority of these applications are set up and run by regional development bureaus, in an effort to create tools to benefit the region economically.

It is evident, therefore, that there is a need to create and publish more detailed information about industrial zones, even though there is a lot of work to do before this can be accomplished. Unfortunately, in the current economic crisis, many initiatives of this type have been halted.

IV. THE INDUSTRIAL GIS OF ÁLAVA: ALAVAMAP.ES

The industrial GIS *alavamap.es* is composed of three layers of information that give us a thorough knowledge of its industries. These three layers correspond to industrial parks, the parcels of land within them, and the individual businesses.

IV.1. Industrial Parks

During the first phase of the project, data was gathered on 46 industrial parks located in 18 municipalities in the Basque province of Álava. These zones cover 25 km², with the largest park being Jundiz (Vitoria-Gasteiz) with 6 km².

IV.2. Parcels and Their Status

A second layer of information contains data about individual parcels and their status. Parcels, or lots, are the units that an industrial park is divided into. With this information it is possible to obtain and analyze real occupancy information. This information is relevant in order to manage industrial land with the goal of sustainability. Maintaining this database allows us to «visualize» the real state of industrial parks, allowing business to reutilize space, thus avoiding the creation of new industrial zones.

IV.3. Businesses

The last layer corresponds to individual businesses, where, by means of interviews (field work) we were able to verify business activities. We created this layer with the data from 2,762 businesses. The information in this layer forms a georeferenced database of all the industrial businesses in Álava, together with the information of their CNAE codes, number of employees, and contact information (Web page, email address, telephone number, and so forth).

V. ANALYSIS OF THE RESULTS AND PROPOSED IMPROVEMENTS

V.1. Analysis of the Results

The interviews that we conducted have shown that, during *alavamap*'s first three years, it has been well received, highlighting the need to be able to access real information about industrial spaces, which has often been difficult. The majority of those interviewed about the GIS acknowledges both the difficulty and importance of having access to this updated knowledge and describe the tool as both useful and necessary. However, since its inauguration in June 2010 this tool hasn't been updated, and this lack of regular maintenance has made it increasingly less useful.

In a different but related vein, EUSTAT, the Basque Institute of Statistics, has planned to publish its *Directory of Economic Activities* in GIS format. This is an essential source of data for expanding the industrial GIS. This GIS would be the ideal platform to compile essential

and relevant data about industrial spaces, creating a published catalog, updated every year, to be used by all government agencies charged with managing industry as well as by the businesses themselves.

In addition to the problem of the GIS not having been updated since 2010, another perceived problem centers on the usefulness of the CNAE descriptive codes. These codes, developed by statisticians to classify the principal activity of a business, are often used to study the economy. However, in many instances, the businesses themselves perceive these classifications as too complicated, and in fact many do not even know their own classification, rendering this a useless tool for finding clients or associates. Thus, it will be necessary to introduce new, simpler variables to describe the products and services offered by each business. Additionally, the agencies charged with managing industrial space have also expressed the need to incorporate variables that are linked to what each business is actually doing or performing—that is, they need a more useful way of categorizing data.

V.2. Proposed Improvements to the Industrial GIS

As a consequence of the interviews conducted with people who manage the industrial space in Álava, and in order to invigorate the industrial sector, we propose a group of new variables which, integrated into the GIS, would form a technological infrastructure which could serve industry and also promote economic and sustainable development.

a. Include products and services offered by each business

Characterizing business activities using the CNAE coding system has proven insufficient. Although this system is useful for detailed statistical analyses, and its use by the Spanish government makes it indispensable, we suggest adding new categories. It should be possible to expand its scope by introducing new variables, such as products produced or manufactured and services offered.

b. Include functions: How is space used?

In order to understand the ever more complicated and heterogeneous mosaic that is the present-day reality of industrial parks, it would be very helpful to include data about what facilities each business houses—manufacturing space, warehouses, logistics centers, offices, etc.

c. Include industrial waste management

To manage industrial spaces sustainably means taking into account the management of industrial waste. In some industrial parks there is no municipal waste collection. However, a knowledge of what waste is generated by each business could lead to a more synergistic and cooperative approach.

d. Include certifications of quality

Currently, certifications of excellence and quality have been a key factor in a company's business strategy. Integrating this information would allow a much more complete understanding of the economic web of any region or industrial park.

e. Include certifications of environmental compliance

Industrial businesses must comply with various environmental regulations. Information detailing which businesses in any given zone or region have these certifications would create another useful variable, providing a means of driving sustainable development in the region.

f. Include R&D&I variables

Activities related to the knowledge economy are considered strategies of great importance. To understand the extent and quality of these activities, official statistics are published every year detailing Research, Development and Innovation (R&D&I) in businesses. The statistics include expenditures on R&D&I; the number of employees dedicated to R&D&I; the education and training of those employees; patents and useful models produced; and other important data. However, in general, this data is usually in aggregate form, broken down only by region or province. To have this information at our disposal, disaggregated to the individual business level, would help to strengthen the knowledge economy.

VI. CONCLUSIONS

In order to establish the necessary strategies to help the industrial sector, we need a deep understanding of industry in all its current complexities. Maintaining a system with the necessary information that can provide appropriate knowledge to the people charged with industrial management and promotion, and development of future strategies, would be similar to actually carrying out continuous field work.

As we have seen, these processes of data collection and sharing have not only been transforming industrial zones but also predicting future trends. Industrial GISs allow us to observe and manage these areas and their infrastructures using the criterion of sustainability, and ultimately, these tools allow us to promote industrial activity by identifying the strategic advantages of the province. Just as the interviews led to the success of the GIS, in order to continue, it will be necessary for all parties involved to join forces, carrying out, on the one hand, an important inter-institutional cooperation, especially in order to compile and organize so much dispersed information. On the other hand, this initiative will also involve cooperation between the public and private spheres, all of whom will benefit from the many advantages of this industrial GIS.

This information must include all the above themes and be universally available. Information is knowledge and knowledge must always be the basis of action.

