

Denmark:
An exciting country waiting to be discovered



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Visualisation based on GIS (geographic information systems) can deliver a variety of benefits to both public and private companies, especially when combined with personal data and operational and applied to sales-related problems. It is an exciting discipline that can reveal much about a country or even a small district.

How much do we really know about a country such as Denmark? By combining geographical and business intelligence you can draw up intelligent maps that provide previously hidden information about a range of topics such as public health, the water environment, bird life, the tax base, consumer spending power and much more. It is now possible to analyse right down to small areas – for example 50 square metres. By combining multi-source data and geographical maps you see information in a new context – and get actionable insights.

Students rarely get the opportunity to tread such new and exciting paths, but the Department of Economics at the University of Copenhagen offers courses that introduce GIS to economists and other social scientists with an interest in model-based empirical research.

“It is certainly fun and exciting, but don’t get me wrong – it is also challenging work that requires analytical thinking,” says Professor Hans Oluf Hansen, Department of Economics. “Our course, *Introduction to GIS for Economists and Social Scientists*, develops skills beyond those of the typical SAS business end user, who gets useful business intelligence with simple point-and-clicks. Our students gain in-depth knowledge of SAS and geographical information systems (GIS),” says Professor Hansen.

As the leading teacher and researcher of demographics, Hansen sees it as a challenge as well as a privilege to have the opportunity to study real issues and carry out useful research.

Democracy calls for open data

"I regard open access to data – aggregated of course – as essential to understanding the complexities of a democratic society. We could call it social transparency – being able to track social developments and their consequences," says Hansen. "By using SAS® Bridge for ESRI you can get a comprehensive understanding of Denmark. For example, you can see which urban areas need a boost to preserve their communities. You can see the educational level of the population, the age distribution, and personal income and thus get an overview of the trends in the demographic development. This means that the social debate is raised to a completely different level, and as a scientist I find this extremely interesting."

SAS Bridge for ESRI is the outcome of an extended collaboration between SAS, the world's leading supplier of business intelligence solutions, and Environmental System Research Institute (ESRI), the leading developer of GIS. GIS software combines different layers of data with geographic data to obtain new and more in-depth knowledge about geographical units such as country, city or residential district. This research can be used within businesses. Geographic data combined with demographic data such as age, size of household and household income can, for example, help retail companies or banks to decide where to locate outlets or branches. SAS Bridge for ESRI is also useful to public authorities, for example to examine how large a territory will be flooded in the event of a rise in water levels or to detect patterns in certain types of crime. Indeed, the possibilities are endless.

Mapping mortality

Hansen is engaged on teaching and research projects that help to develop such possibilities. "Even though we take existing knowledge as our point of departure, GIS and business intelligence have not previously been combined in this way, so we are treading new ground. It takes practice to set the right parameters. When these are in place, however, we will certainly get interesting results," says Hansen.

In an academic course at the Department of Economics, the students combined health data from Copenhagen Municipality with demographic, economic, and geographical data with the help of SAS and ESRI. "We already knew about mortality distribution across Denmark's districts. We knew that the people of Copenhagen, for example, have a mortality rate that is 13 percent higher than the national average. But when we drilled deeper into the data for Copenhagen and drew up a graphic overview on street maps, we discovered surprisingly large differences in mortality between neighbourhoods right down to tax collection districts. For example in a clearly defined area of outer Nørrebro, the mortality rate rises to 60 percent above the Copenhagen average," says Hansen.

"Not surprisingly, we could see from the results of the analysis that the differences in mortality correlated with factors such as household income, unemployment and ethnicity. Copenhagen Municipality already had all the data, but we needed to break down the figures and analyse the data to gain new knowledge and acknowledge and communicate correlations," adds Hansen.

Getting close to consumers

For a long time the advertising industry has mapped income, age distribution, and spending according to the "mosaic" method where areas down to 50 square meters are studied to get a close-up view of consumers and acquire knowledge that delivers a competitive edge. But today, visualisation via GIS is a must for the advertiser, and this

type of knowledge is classified as a top secret asset by sales and marketing departments.

“By employing SAS in combination with ESRI we can reveal patterns that were previously hidden, establish geographic correlations and thus accumulate new, important knowledge. Working with geographical visualisation makes it possible to see and understand correlations that influence your line of work. This means you will be able to make better decisions and solve both commercial and public policy problems faster,” says consultant Henrik Dahl of SAS.

SAS Institute

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Environmental System Research Institute (ESRI)

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