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Future tools for area administration and public participation

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ABSTRACT

This paper presents a mapping of the online facilities concerning planning and geographic information that is currently offered for public participation at the Danish municipal and regional websites respectively. The Danish physical planning system has for the last 35 years consisted of three hierarchical levels: National, regional and municipal. The regional level has handled larger environmental issues and everything concerning planning and administration of non-urban areas; costal areas, nature preservation and restauration, agriculture, natural resources, water quality etc. The Danish government has recently decided to eliminate the regional administration level and transfer the planning tasks to the municipalities, who has up till now almost entirely dealt with planning of urban areas. The problems and complexities that has to be handled in the open area planning differ from those concerning urban areas, often there are substantial conflicts between utilization and protection of the area resources, and the municipalities needs to develop methods and strategies to handle these new tasks. Among the challenges is to offer credible and convincing information about the potential conflicts between nature protection and economic development. The purpose of the mapping is therefore to compare the tools applied to the different tasks – urban and non-urban - to clarify which kind of planning support systems the municipalities will need to develop to offer the same or better possibilities for the public to participate in the planning processes and discussions.

1 INTRODUCTION

All over Europe the transformation of the public sector to meet the requirements of e-government is high on the agenda. The core of e-government is to create better and more efficient solutions to administrative tasks through the use of information technology. Denmark has set the goal of being among the countries that are best at utilizing the digital transformation to create growth and welfare. The ambition is to utilize the potentials of digital society across all levels of government to organize the public sector in a more flexible and efficient way and with higher quality of service for the citizens. By implication, these goals should be reached without increasing the public expenditure. One means to decrease the expenses is supposed to be selfservice applications for citizens on the public authorities' webpages. This also applies to regulatory processes and administrative procedures involving geographic information, such as physical planning processes. Some processes and applications are fairly simple to digitise and arrange for selfservice; if the applicant fulfils the conditions permission can be expected offhand. One example of this is permissions for smaller construction projects in the urban area. For all parts of the urban areas straight rules and regulations are made telling clearly what is allowed in each local unit. In the preparation of the regulations (called framework regulations for local plans) all relevant plans and legal acts are taken into consideration and no further interpretation of the resulting regulations are needed. Contrary, when it comes to gaining permissions for area-use or construction in the rural area the situation is often much more complex, and every permission is based on individual judgement made by the professionals in the county administration. In each case the often contradictory interests of protection and utilization of the natural resources in the area of concern must be balanced against each other. This balancing is often extraordinary complex as the weight of the individual elements vary in differing situations and determining factors depend on the very local conditions as well as overall considerations. Administrative procedures like that are not well fit for selfservice via webpages, or would in that case require a very detailed regulation of the rural area. There is no tradition for regulations of such detail of the rural area in Denmark, and it would require a very comprehensive planning, which in many cases by far would exceed the actual needs, and furthermore could lead to many unnecessary conflicts and problems.

In the year 2004 the Danish government has decided to implement a reform of the structure of the public administration. For the last 35 years the Danish administrative system has been based on three levels of government; national, regional (the counties) and municipal. It has now been decided to eliminate the county level and transfer the administrative tasks partly to the state and partly to the municipalities, who in term should be bigger than they are today. For the physical planning this means an entirely new structure, where the municipalities, who has up till now primarily been occupied with urban planning and local infrastructure issues, from now on must handle the rural area, nature and environmental planning. In terms of methods the municipalities are not geared for the new tasks, that imply a much more individual and judgement based administrative praxis. At the same time grassroot organisations and local groups of citizens express concerns that the new municipalities will weight issues of nature and environment lower than concerns of economic development when competition on factors like retailing, business localisation and places of employment intensify among the new bigger municipalities. Consequently, there is a need for development of methods that aim at the following:

Effective and flexible tools for the regulatory processes of the area administration in the rural areas, and

Tools that provide transparent and credible insight in the municipal priorities concerning physical planning, nature conservation and economic development.

This paper reports on a research project that aims at elucidating and developing such tools and methods. The first step has been to monitor the diffusion of GI-based services offered on the municipal and county websites respectively. These services are classified in order to give an overview and make a comparison between the two levels of administration possible. Focus is then on the tools and services offered by the counties, in order to find which of these the new municipal services could be based on or inspired by. But first the Danish planning system will be briefly presented, as well as the basis and core content of the structure reform. Next the method for classifying the tools and services will be presented, as it forms the basis of the survey design.

2 BACKGROUND

2.1 The Danish Planning System

Denmark has three administrative levels; national, regional (the counties) and municipal, each taking care of welldefined components of the big jigsaw puzzle of planning and administration of the society. The national level provides the legislation and marks out the overall strategic framework for the development of the country. These frameworks, known as national planning directives, are expressions of the current political visions of the overall development of the country. The counties are responsible for handling larger environmental issues and everything concerning planning and administration of non-urban areas; coastal areas, nature preservation and restoration, agriculture, natural resources, water quality etc. The regional councils are responsible for the preparation of a regional plan that takes all these issues (and many more) in consideration. The plan must be renewed and updated on a 4 years cycle and the intentions and visions in the regional plan must be in compliance with the present national planning directive. Urban planning and development are handled by the municipalities, who like the regional councils must renew and update their municipal plan on a 4 years cycle. Regulations and purposes in the municipal plan must not be in contradiction with the visions and regulations in the regional plan, and in this way the counties serve as a watch-dog for issues that concern the larger environmental and natural structures. Furthermore the counties have a certain degree of veto power when it comes to proposed economic development in the municipalities that will have a large or negative impact on nature, environment or other sustainability issues of the region.

2.2 The Structure Reform

The current administrative structure consists of 270 municipalities and 14 counties. Since the forming of this structure in the late 60's the tasks of the public authorities on all levels have developed dramatically, specially when it comes to the demands of the social and environmental sectors. This development has led to a situation where the physical size and economic capabilities of the municipalities and counties no longer match their tasks. Smaller municipalities (some with just a few thousands of inhabitants) do not have space in the budget to employ the necessary expertise personal to handle new environmental planning and control tasks. The counties for their part have proved to be too small to handle the task of being responsible for the hospital service, a task that takes up more than 80 % of the counties' budgets. These facts are among the rational explanations to the coming reform of the administrative structure, in Denmark known as the Structure Reform. Other explanations are purely based in ideology and political visions and will only be touched in this paper to the extent they can explain the future structure as it currently augers.¹

The future structure comprises 5 large regions and a yet unknown number of municipalities, probably about 100. The new large regions will no longer have an independent part to play in the physical planning. All planning will from now on be handled by the municipalities and by national institutions. The regions will play a part as formal watchdog of the municipal planning, but with no actual power of veto or political influence. This puts a very heavy burden of new tasks on the municipalities, tasks only the largest municipalities – if any at all - currently has the competence to lift. Although the new municipalities will be larger than the present they will not nearly match the volume of the counties. This still puts a limit to the number of specialised personnel the municipal administrations can afford to employ to take care of the administrative procedures concerning area administration. A central premise for the restructuring of the public sector is that it should be carried out without increasing the public expenses, meaning the transformation should take place within the limits of the existing municipal and regional budgets. No one in their right mind can expect a process like that to take place without expenses, and the only way to balance the budget will be to decrease the number of employees in total.

2.3 New tools needed

This is the background of a situation where the coming new municipalities have a huge need for new efficient methods to handle their current planning tasks and new knowledge and methods to handle their new area administration tasks. Furthermore there is a need for the municipalities to forestall any critique from the citizens about centralisation of the power and lack of democratic influence. Local communities and grassroot organisations fear that the new municipalities will be apt to sacrifice the considerations of nature and environment to the advantage of economic growth and commercial interests. To avoid these accusations the municipalities need to offer the public credible information and tools for participation in planning processes. Generic terms for tools that might cover many of the above mentioned needs are Webbased Planning Support System (WPPS) (Peng, 2001) or internetbased Public Participation GIS (PPGIS) (Carver, 2001), (Weiner et al., 2001). Of special interest are applications that can support and communicate processes and decisions that are based on judgement rather than strict rules and regulations. A number of architectures and implementations of WPPS and PPGIS have been suggested in the literature, such as (Geertman, 2002) and (Rinner, 2001). These will obviously be considered in the present research. But the author takes the starting point in an assumption that the ones most familiar with the tasks and their handling are the existing municipalities and counties, respectively, and that technology-leading municipalities and counties already have developed adequate tools for many of the tasks. Hence first step towards a design of future tools for the area administration and public participation would be to:

identify existing examples of best practice on municipal and county level, and

¹ It must be noted that there are substantial disunities between the government and the opposition about the future arrangement of the planning system, specially the role of the new larger regions. The government has enacted their proposed model with a narrow majority with the support of a radical right wing party. Elections for the Danish Parliament must be held during 2005, and should the current opposition win, they are very likely to change substantially the appointment of tasks concerning physical planning giving more power to the regions.

analyse the difference between the municipal tools and the applications developed by the counties in order to clarify which kind of planning support systems the municipalities will need to develop to offer the same or better possibilities for the public to participate in the planning processes and discussions.

The remainder of this paper will report on a survey of the relevant applications found on the webpages of the municipal and county administrations. As the applications in focus are offered by Public Authorities (PA) on their WEB sites and offer access to Geographic Information (GI), they will be termed PAGIWEB for convenience.

3 THE SURVEY METHOD

During a few weeks in September 2004 all municipal and county websites were visited and any instances of PAGIWEB was noted and classified due to their characteristics. For the classification a method described by (Campagna and Deplano, 2004) was used. The method is based on an adaption of a taxonomy aiming at defining the level of service of a WPSS proposed by (Peng, 2001). The revised taxonomy made by (Campagna and Deplano, 2004) reflects a reality with a less extensive implementation of public participation than presumed by (Peng, 2001). The used taxonomy has the form of a bidimensional matrix whose variables are content and technology, called CTM (Content/Technology Matrix). The content levels, C1-C4 varies from general information concerning an area or territory, over planning documents, raw downloadable data to bidirectional informational tools. The Technology axis comprises 5 steps, T1-T5, moving from static maps in html or PDF documents via more and more sophisticated and dynamic tools to advanced WPSS functions. The two axis' form 20 cells each comprising a characteristic combination of information content and applied technology. As shown by (Campagna and Deplano, 2004) with regards to the Italian case study using the CTM it is possible to classify the PAGIWEB in a way that makes comparison easy between institutional levels, between different countries, and in different time steps. Tabel 1 shows the C and T levels of the matrix and the generated matrix cells.

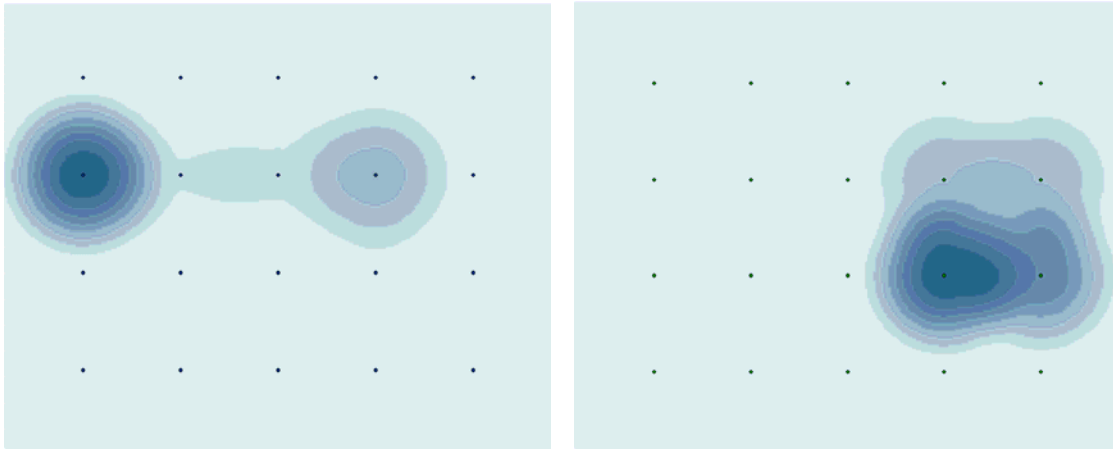
Content\Technology	T1: Web browsing, static maps (HTML and PDF)	T2: Interactive map images	T3: Highly interactive, dynamic maps, multimedia, 3D, VRML	T4: Basic web-GIS functionality, search, query and analysis	T5: Advanced web-GIS functionality, 2 way communication
C1: General information of city or area, turistmaps etc	C1T1	C1T2	C1T3	C1T4	C1T5
C2: Plans and planning information, information about environment and nature	C2T1	C2T2	C2T3	C2T4	C2T5
C3: Raw data, downloadable in GIS or tabel format	C3T1	C3T2	C3T3	C3T4	C3T5
C4: analysis tool, focused bidirectional information flows	C4T1	C4T2	C4T3	C4T4	C4T5

Tabel 1 The elements of the CTM – Content/Technology Matrix. After (Campagna and Deplano, 2004)

4 THE RESULTS

171 municipalities offered some kind of PAGIWEB on their website, ranging from basic static maps in local plans and municipal plans in PDF documents to advanced web-GIS applications with feedback tools. All 14 counties have implemented web-GIS to provide plotowners, agricultural consultants, property handlers, windmill owners, municipal authorities and other professionals with updated information about regulations and zonings in the rural area. The functionality and level of sophistication of the county PAGIWEB varies slightly but they are all in the lower right part of the CTM.

The CTM classification method has proved to be a useful way to relatively fast build an overview of the diffusion of PAGIWEB. The scales of content and technology, C1-C4 and T1-T5 are nominal in nature but do also imply a clear progression towards more advanced tools and higher levels of interaction and participation. Although the allocation of the PAGIWEB to the specific cells in the CTM rely on judgement, and thereby is prone to a slight subjectivity, it is fairly easy to determine which cell a certain PAGIWEB falls into. Hence the resulting classification can be considered quite consistent. To ease the comparison of the resulting matrices a spatialised representation is compiled by calculating the cell density of the CTM. The results are shown in figure 1 and commented in the following two paragraphs.



Figur 1 Spatialisation of the CTM on Municipal level (left) and County level (right). Each dot represents one cell in the CTM

4.1 Municipal level

The results on the municipal level is shown in tabel 2. The spatialisation of the municipal level CTM results in a very uniform shape with the main weight centered on the C2T1 cell and a smaller accumulation around C2T4. To put it short this reflects that the Danish municipalities who offers PAgIWEB either do this in form of master plans and local plans in PDF-documents or as relatively advanced municipal web-GIS' including planning zones and related information and documents. Some municipalities have both a masterplan in PDF and a web-GIS and in that case they are categorised in the highest of the two categories. The web-GIS' found at the municipal websites are very similar in structure and functionality and must be considered a reflection of the products the GIS-vendors currently offer. There are only a small handful of firms selling these solutions in Denmark, and it can not be concluded from this first survey wether the functionality the webGIS's encompass reflects the needs and commands from the municipalities or rather shows what the vendors are capable of delivering. A small number of municipalities have developed their own systems (or developed further the standard solutions) to better meet the requirements of a planning information and participation system. An example of this is the municipality of Aalborg that offers access to statistical information, gives tools for analysis based on the users own preferences and offers the data for download in tabular formats as well.

The near-absence at the municipal level of PAgIWEB in the C1 category is worth noticing, and two explanations come to mind. One is that very general purpose static maps might not have been identified as PAgIWEB in the survey. The other is that municipalities that are aware of the importance of communicating via maps and GI very often focus this communication on themes related to planning and thereby move to category C2. Each municipality is only classified once and always in the highest achieved category of PAgIWEB found on the entire website.

Content\technology	T1	T2	T3	T4	T5
C1	2	0	1	0	0
C2	94	11	12	37	3
C3	0	0	0	4	0
C4	0	0	0	0	0

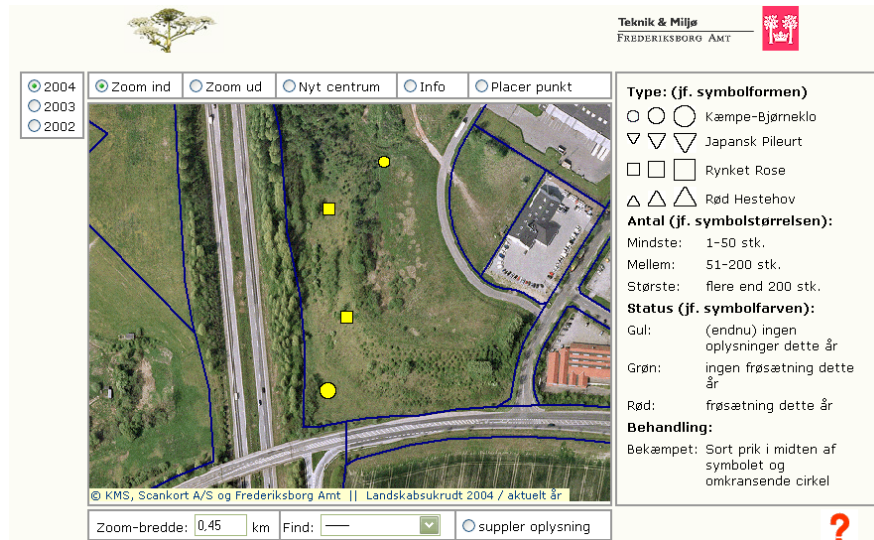
Tabel 2 Results of the survey at the municipal level, number of examples

4.2 County level

The results on the county level are shown in tabel 3. As mentioned above all the counties are represented, and although some of the counties had more than one application each county is only classified once, as was the case with the municipalities, according to the highest achieved level of content and applied technology. Not surprisingly the standard and sophistication of the county PAgIWEB are generally higher than the municipal applications. 10 counties offer their GIS data freely for download in XML/GML or software specific formats (MapInfo or Arcview). In the download sections the counties usually also links to freely downloadable GIS-viewers like ArcExplorer or MapView. These services are partly a consequence of the Aarhus convention (UN ECE, 1998) that assures citizens in ratifying countries free access to data concerning their local environment. Formally seen this obligation is already fulfilled by the web-GIS, and the download option provides citizens with the necessary skills a valuable extra basis for participating in planning processes. The download option only covers data that the county itself produces, as copyright agreements for the basic maps usually do not make such a free service possible.

4 counties have applications where the citizens are encouraged to make online registrations of occurrences of hogweed and other kinds of weed that spread vigorously in the uncultivated parts of the rural areas, see figur 2. These are so far the only instances of PAgIWEB where the citizens can act directly as data suppliers. A number of the municipal web-GIS' as well as most of the county web-GIS offers functions for "redlining"; digitalisation or marking of an area in the map and provides guidance on how to attach a screenshot of such a redlining to an email to the administration for commenting and questions. In this way the citizens can augment

their comments and questions with GI but they do not directly supply the application with new information content as it is the case in the hogweed registration. With the evolving WMS and WFS technology it must be expected that functionality where the citizens can digitalise and submit GI directly online will be an obvious part of future PPGIS, and for that development a closer examination of the experiences with the hogweed registrations should be made.



Figur 2 Online tool for registering occurrences of i.a. hogweed. The citizens can place a marker where the weed has been observed and supply additional textual information about the observation.

Another application worth mentioning is the 3D-model of North Jutland. In October 2002 the 3D-application was launched, using the TerraExplorer from Skyline software systems. In this application the users can fly above and investigate the entire region of North Jutland visualised in 3D by an orthophoto mosaic draped on a dhm. The application admits the user to “fly” from one address to another, circle round specified targets and navigate freely in 3 dimensions. Buildings are extruded from the orthophoto as blocks, based on polygonal information from technical maps. This gives a rough but yet realistic impression of the surroundings. Different themes can be applied to the model, such as tourist information (with links to relevant webpages), bicycle routes, nature camp sites for hikers etc. But the model was also used for visualising different scenarios in the planning process of a large wind mill farm. In combination with electronic meetings these scenarios were valuable supplements to the more traditional means of debate and participation in the planning process.

All counties specifically stress that the data in the PAGIWEB are purely consultative, several of the themes are not precise at a detailed level and the shown registrations do not per se constitute a legal binding or regulation on the property. In these and similar ways the counties implicitly try to communicate the complex nature of the judgement based administrative processes and the fact that the maps can not be interpreted directly as a guarantee for permission or rejection in any specific case. The question is whether the non-professional users will understand these distinctions. And if they do, will they understand it too, if a future municipal web-GIS have the same sort of declaration following some of, but not all, the data?

Content\technology	T1	T2	T3	T4	T5
C1	0	0	0	0	0
C2	0	0	0	2	2
C3	0	0	0	6	4
C4	0	0	0	0	0

Table 3 Results of the survey at the county level, number of examples

5 DISCUSSION

The higher sophistication of the county PAGIWEB compared to the municipal PAGIWEB is not surprising. The combination of physical size, complexity of tasks and economic capacity in the counties were fundamental determinants that the counties’ departments for nature and planning were among the pioneers of GIS use from the very beginning, and they still mark the lead of geo-tool implementation in Denmark. A strong professional network between the GI-professionals in the counties have further served to consolidate this, taking advantage of synergetic effects of common data models, application development etc. The CTM clearly reflect this fact, and also shows a will from the counties to do more than just inform the public. This attitude ought to be adopted by the municipalities in the future, as the situation at present clearly shows a tendency towards informing the public rather than involving the citizens actively in the planning processes, at least when it comes to the implementation of relevant GI-based tools. Unfortunately, this is not just a simple matter of implementing the adequate technology. When it comes to a thing like offering the municipal data freely for download, legal, institutional and economic hindrances block the way. 35 years of autonomy, and a huge variance in the size and capacity of the municipal administrations across the country has not led to a synergetic cooperation like the one on county level. Merging 270 municipalities to about 100 is not going to be an easy task, and among the GI-professionals in the

municipal administrations there is a clear recognition that a smooth transformation can only be accomplished on basis of a sound, common (geo)data model. A common data structure based on the recommendations from the INSPIRE network has been proposed, and it can be hoped that the implementation of such a datamodel can ease also the implementations of more advanced PAGIWEB at the municipal level.

6 CONCLUDING REMARKS AND FURTHER INVESTIGATIONS

At this point it can be concluded that the PAGIWEB at the municipal and county level to a great extent reflects the tasks of the respective administrations, and that the counties due to their capacity and professional networks have been able to implement PAGIWEB of much higher and more consistent sophistication than the municipalities. The basic functionality of webGIS offered on municipal and county websites are not substantially different, the difference here arise from the thematic layers and their properties and the fact that the counties make a serious effort to warn the public not to take the information in the maps too literal, so to speak. But in addition to the basic webGIS functionality many of the counties offer tools that substantially expands the public's options to take an active part in the planning processes. Further investigations in the presented research project will take these tools into closer considerations in order to evaluate their feasibility and applicability to the new municipal level of administration. So far, the CTM mapping and comparison has laid a valuable ground of overview of the diffusion and standard of PAGIWEB at Danish municipal and county websites.

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