The Routledge Handbook of Planning Research Methods

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Published online on: 17 Nov 2014

Accessed on: 09 Aug 2023
https://www.routledgehandbooks.com/doi/10.4324/9781315851884.ch3.6
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ANALYSING CARTOGRAPHIC REPRESENTATIONS IN SPATIAL PLANNING

Stefanie Dühr

Introduction

Spatial planning maps are powerful instruments to frame discussions in plan-making processes and for the visualisation of existing and envisaged land uses on which future decisions are based. Yet despite their communicative potential, the role of cartographic representations has received less attention in spatial planning research than communication in planning processes through text or actions. Many planning researchers may therefore feel poorly prepared to analyse the design, content and meaning of planning maps and how they are used in planning processes. However, the analysis of maps and cartographic representations should be an essential part of the toolbox of every planning researcher interested in policy analysis and policy design. The visual expression of spatial policy can offer a different, and sometimes complementary, view on the envisaged use of space to that put forward by policy text. After all, planning maps have been described as the ‘forms and crystallizations of the thought of […] planners as they go about their work’ (Söderström 1996: 252). Moreover, any spatial planning researcher interested in unravelling power structures in planning processes and planning outcomes should develop a keen analytical interest in cartographic expressions of spatial policy. Especially in comparative planning research, analysing the style of spatial images in different spatial planning traditions – and the reasons for these differences – is a promising avenue to pursue to better understand how spatial planning systems function and perform.

In this chapter, a qualitative research design to investigate the design and content of policy maps and text is presented. The analytical framework for spatial planning maps that forms the backbone of such structured inquiry is based on theoretical perspectives on cartography and spatial planning, which understands maps as social constructions. This view acknowledges that maps are prepared in a particular sociopolitical context and in their analysis should be treated and deconstructed as such. The framework was developed to undertake a comparative analysis of strategic spatial plans in Germany, the Netherlands and England in order to investigate planning traditions of visualising spatial policy, as reported in Dühr (2005, 2007). In line with a social-constructivist epistemology, a qualitative research strategy and research methods that allow reflection on the ‘rootedness’ of planning practices are most appropriate. However, such interpretive approaches require a discussion of the
methodological challenges of empirical analysis, including how to control for subjectivity
in the reading of maps and texts.

**Spatial planning and cartographic representations: an analytical framework**

In planning processes, maps exercise power through numerous ways. The decision of what
should be ‘put on the map’ and how it is going to be presented opens up great potential to shape
discourse, to empower some parts of the public or the territory, and to disadvantage others. Maps
can be used to achieve coherence among actors in a territory and to position it externally, but
they can equally be used to manipulate other actors (Dühr 2005, 2007).

But how should a planning researcher go about analysing maps? It is often said that if a pic-
ture is worth a thousand words, a map must surely be worth a million. While it is easy to see
how such rich information and communication potential – if used effectively – is invaluable
in complex planning processes, it also implies that different people – for individual or cultural
reasons – may read maps differently and possibly extract very different information from the
same map. Moreover, as semiology (i.e., the study of signs) emphasises, every single sign on a map
can have multiple meanings. Connotations of signs can elicit feelings or emotions in the user
that are often culture-dependent. Colour, for example, frequently plays on culturally embedded
connotations, such as with the pale red traditionally used to depict the British Empire, suggest-
ing strength and vigour (Vujakovic 2002). The multilayered meaning of maps and the inherent
subjectivity in map reading and map use therefore require careful theoretical and methodologi-
cal consideration when approaching the analysis of spatial policy maps in a systematic and com-
parable manner.

In this chapter, the approach taken to analysing spatial policy maps in European planning
traditions is used to show how this might be achieved. The research on which this chapter
draws (Dühr 2005, 2007) started from the observation that the reasons for highly controversial
discussions among representatives of national and regional planning ministries of the EU-15 in
the preparation of maps for the intergovernmental ‘European Spatial Development Perspective’
(ESDP) (CSD 1999) may be rooted in the differences among planning traditions’ understand-
ing of the role of maps in planning. The research aim was therefore to investigate whether such
planning traditions in visualising spatial policy exist, and if so, which influence these different
traditions – vis-à-vis other factors – have had on maps prepared during the ESDP process.

The spatial concepts used and the approach of a planning tradition to visualising spatial
policy are historically rooted, but have over time also strongly been shaped by the wider geo-
 graphical, socio-economic and political context. What emerges in contemporary spatial plans,
thus, may be a combination of the traditional ‘core’ of a planning culture, complemented by
more recent changes to the understanding of planning and planning responses and instruments.
In analysing planning maps, thus, it is important to reflect on the context within which they
have been prepared, the role of planning traditions and their understanding of planning.

Some classic texts on the analysis of historical maps in the cartographic literature, notably
J.B. Harley’s (1989) work on ‘Deconstructing the map’, prove inspirational for the question of
how to approach an analysis of the socially constructed rules and values and the way in which
they affect map-making. Drawing on Harley, Pickles (1992) proposed to consider maps as being
constructed of two interrelated structures: one being graphical, the other linguistic. The graphi-
 cal structure of the map and the effective use of symbols and graphic variables have been subject
to extensive study over the last decades (for an overview see Dühr 2005, 2007). In contrast, the
context within which a map is prepared and how this influences its design and content (i.e., the
‘linguistic structure’) are considerably more complex to analyse. However, according to Pickles (1992), the graphical and linguistic structures of a map are almost inseparable from each other, as the linguistic elements are embedded within the image. Analytically, this implies that the ‘technical’ procedures for the preparation of cartographic representations need to be considered alongside the social and political context within which the map was prepared and the uses for which it is intended. Such a social-constructivist understanding of maps that ‘do not communicate so much as provide a powerful rhetoric’ (Crampton 2001: 238) allows an approach to map analysis through which they can be ‘critically examined as texts themselves’ (ibid.).

Different types of maps are in use in spatial planning processes. Moll (1991, 1992) distinguished at least three main categories, which are used to varying degrees in the process of preparing a spatial plan. These categories include (1) ‘base maps’ of a mostly informative character – that is, maps of an analytical thematic or topographic nature (e.g., on population development or transport infrastructure); (2) cartographic representations for participative purposes – that is, maps setting out policy options with a strongly communicative character; and, lastly, (3) cartographic representations that lay down the objectives of the plan in its final form, often with legal status and that are aimed at reproduction. No map is value-free and unbiased, but spatial policy maps that express longer-term spatial development visions are most obviously expressions of political interests. However, these political interests may or may not be easy to identify, because aside from clear and dominant policies that can be identified there are likely also more subtle representations of interest or manifestations of power embedded in the plan map.

By using a certain commonly accepted code of representation that communicates the legitimacy of planning policies or intended actions, cartographic representations in planning demonstrate a persuasive power which helps to win over public opinion and to coordinate the actions of a wide variety of users and interests (Söderström 1996). The representation of certain interests over others and the power of planning maps have become manifest through planning approaches such as the principle of zoning since the 1920s, because as Söderström (1996: 266) explains,

what resisted graphic treatment would be slowly pushed into the background, so that the diffusion of zoning […] corresponded to the elaboration of a form of urban planning which essentially depended upon visualizations. This does not mean that urban planning was limited to dealing only with the visible forms of the city, but it does mean that the elements dealt with by urban planning would be taken into account all the more readily if they could be visualized. The passage through graphic representation became a condition of entry into the urban planner’s laboratory.

In designing a framework for a social-constructivist approach to map analysis, criteria related to the linguistic aspects of maps were derived mainly from Harley’s (1989), Pickles’ (1992) and Söderström’s (1996) work. However, because neither Pickles nor Harley provide a very detailed account of the ‘elements of a map’ with regard to its graphic structure, criteria for analysing the design of maps were further operationalised with the help of cartographic literature (see Dühr 2005, 2007). The criteria for analysis are shown in Tables 3.6.1 and 3.6.2 and explained in the following.

With regard to what Pickles (1992) has called the ‘graphic structure’ of the map, three categories were chosen for the comparative analysis of the cartographic representations in strategic planning instruments: the level of abstraction, the level of complexity and the use of associative colours and symbols ‘on the map’.

- The level of abstraction arguably reflects the underlying view on the reliability and binding character of planning policy (Dühr 2007), with a detailed approach implying
planning certainty and little flexibility for deviating from the plan proposal. A more generalised approach, on the other hand, can be seen as leaving room for lower planning tiers to work out more detailed proposals and thus communicating an understanding of the plan as ‘guiding principles’. The ‘level of abstraction’ of cartographic representations can be operationalised through different criteria, as shown in Table 3.6.1.

- The complexity of cartographic representations is understood as an expression of the number of symbols and cartographic layers (expressed through the number of categories listed in the key). By categories, overall ‘themes’ are meant – for instance, ‘transport network’, under which road and rail infrastructure would be grouped, or ‘nature protection sites’, under which habitats or any nature protection designation could be listed. Usually there is limited overlap of elements within one category, and therefore even if the number of elements is high but the number of categories low one could expect the policy map to be still easy to read and to be of medium complexity. Nevertheless, the more elements (symbols) and categories are included in the cartographic representations of planning instruments, the more complex the map would appear overall, which might give hints both about the role of this instrument in the planning process and about the intended audience, as a very complex map might not easily be understood by laypeople.

- Within a planning tradition, association and conventions can help to communicate a message more easily (as can the standardisation of planning symbols among planning professionals). However, there might be differences in association and convention between different planning cultures, which can cause communication problems when discussing policy options in a transnational setting. Therefore, criteria on the use of associative and conventional colour and (pictorial) symbols in planning were also included in the framework for analysis.

<table>
<thead>
<tr>
<th>Table 3.6.1 Criteria for the analysis of the ‘graphic structure’ (Pickles 1992) of cartographic representations in strategic spatial plans</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Design and layout: graphic structure</strong></td>
</tr>
<tr>
<td><strong>Level of abstraction: ‘scientific’ / detailed versus ‘artistic’ / abstract representation</strong></td>
</tr>
<tr>
<td>- Outline of the territory</td>
</tr>
<tr>
<td>- Detailed</td>
</tr>
<tr>
<td>- Generalised</td>
</tr>
<tr>
<td>- ‘45 degree’ (highly generalised outline)</td>
</tr>
<tr>
<td>- Logical differentiation (Junius, 1991)</td>
</tr>
<tr>
<td>- site specific = relatively clear orientation at topographic elements or land use boundaries</td>
</tr>
<tr>
<td>- schematised = rough orientation at topographic elements or land use boundaries</td>
</tr>
<tr>
<td>- schematic = no orientation at topographic elements or land use boundaries, hence spatially vague</td>
</tr>
<tr>
<td>- Graphic differentiation of area symbols (Junius, 1991)</td>
</tr>
<tr>
<td>- strict = area contour delineated by line symbol</td>
</tr>
<tr>
<td>- medium-strict = coloured area symbols with little colour contrast adjoining</td>
</tr>
<tr>
<td>- fuzzy = indication of continuous transition</td>
</tr>
<tr>
<td>- Graphic differentiation of point and line symbols (Junius, 1991)</td>
</tr>
<tr>
<td>- territorially true = approximate location of an object</td>
</tr>
<tr>
<td>- locationally true = exact location of an object</td>
</tr>
</tbody>
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(Continued)
The criteria for analysing the 'linguistic structure' of cartographic representations in strategic spatial plans relate to the emphasis given to policy maps in the plan document, the question of what is most prominently presented on the plan map and how the plan territory is positioned in the wider context. These three categories have been operationalised as follows.

- The relative weight given to text and cartographic representations in the document allows one to assess the importance attached to maps in the planning process of different planning traditions. Several aspects have been chosen to analyse this relationship between 'text' and 'maps' (see Table 3.6.2), including an in-depth content analysis to explore the relationship between the themes and policy options discussed in the plan text, and those that are represented on the policy map. This approach allows an insight into the 'spatiality' of the chosen policy options, and the comprehensiveness of the cartographic representations, and helps to discover patterns of those themes that generally tend to be cartographically represented to the detriment of others.

- The criterion of the visual hierarchy, or what Harley (1989) has called the 'rules of social order', relates to the visually most dominant elements in the cartographic representation of spatial policy. This is a subjective method of map reading to identify those elements on the policy map that 'stand out' and therefore attract the attention of the reader. Such elements can be understood as being the ones that are at the core of the spatial policy proposals represented on the map.

- The last category to express the 'linguistic structure' of policy maps relates to the spatial positioning and connectivity of the planning area. This includes an analysis of whether and how the geographical context of the planning region is depicted. Furthermore, the analysis includes a discussion of the connectivity of the region – that is, a representation of network space and of underlying functional interdependencies (cf. Healey 2007). This appears particularly relevant in collaborative planning processes, where planners are expected to think outside their own territories and increasingly in relational spatial terms.

Table 3.6.1  (Continued)

<table>
<thead>
<tr>
<th>Design and layout: graphic structure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Use of colour</td>
</tr>
<tr>
<td>• Strong/solid (expressing certainty)</td>
</tr>
<tr>
<td>• Pale/soft/mute (expressing suggestions)</td>
</tr>
</tbody>
</table>

Complexity

• Number of elements listed in key
• Number of categories in key

Association and convention

• Use of colour
• Use of pictorial symbols

Source: Dühr, 2007: 80.
Methodological considerations for the analysis of spatial policy maps

If applied systematically, a theoretical framework such as the one presented earlier can offer a useful tool to undertake a comparative analysis of the design and content of cartographic representations in strategic spatial planning. However, choosing an ontology and epistemology from the interpretivist paradigm not only is a theoretical choice but also has, of course, important implications for the research methodology. Applying a ‘deconstructivist’ approach to map analysis or map reading requires qualitative research methods that allow a deeper reflection on the planning context and the resulting plan maps. A promising avenue to a comparative analysis where phenomenon and context are closely interrelated is offered by situating such methods within a case study approach. Yet such a qualitative empirical approach, inevitably, bears the risk of subjectivity – not least because the researcher undertaking the analysis carries some ‘ethnocentric’ baggage, meaning that despite best intentions researchers often tend to view other systems or cultures from the perspective of their own (de Jong 2004). A solid analytical framework is crucial to ensure a systematic and transparent analysis of spatial policy maps according to qualitative criteria. However, despite having a framework based on suitable theoretical perspectives in a deductive approach, a certain degree of subjectivity remains when analysing maps according to the criteria defined. As in every research project, it is important to try to control as much as possible for such subjectivity and possible variation in the application
of the analytical framework to the object of study. Respecting good scientific practices is always important in a qualitative approach to map analysis, but especially so if a comparison of different planning cultures is envisaged. The framework as explained in the previous section and as set out in Tables 3.6.1 and 3.6.2 is intended to provide such a basis for the comparative examination of plan maps in different European countries, but a qualitative methodology as suggested for this research demands that its application by the researcher (or team of researchers) is made transparent and that the recording and analysis of data are clearly explained. Such an approach can then provide an interesting insight into the ‘message’ of cartographic representations in planning.

Every decision a researcher takes in setting up the methodology should be informed by the ambition to best answer the identified research question, and the approach to choosing examples or cases is no exception. For the research on which this chapter draws, the aim was to analyse planning traditions’ approaches to visualising spatial policy in strategic spatial plans. Arguments for which countries to analyse were derived from this, such as the existence of mature planning systems with strategic-level (regional and above) planning instruments and planning institutions. Aside from such structural considerations, there are also practical aspects to think about, including whether all required information is accessible to the researcher (e.g., whether planning documents are easily available, whether they are in a language the researcher speaks or how approachable interviewees are).

Four tests are commonly used to establish the quality of empirical social research – namely, construct validity, internal validity, external validity and reliability (Yin 1999). Construct validity relates to the development of a sufficiently operational set of measures for the concepts being studied. To meet the test of construct validity, the researcher should therefore (1) select the specific types of changes that are to be studied (in relation to the original objectives of the study) and (2) demonstrate that the selected measures of these changes do indeed reflect the specific types of changes that have been selected. Yin (1999) suggests three approaches to increase construct validity: (1) using multiple sources of evidence during data collection; (2) establishing a chain of evidence during data collection; and (3) having the draft case study report reviewed by key informants. For the research approach discussed in this chapter, the desk-based analysis of the planning context and the interpretivist analysis of the policy maps were complemented with other data sources, such as qualitative interviews with planners and cartographers. The initial findings were discussed with experts in the countries and regions under study to test whether they were appropriately interpreted within the respective cultural context. In terms of internal validity, the researcher should ensure that interpretations and claims made are accurate and plausible. Building feedback loops into the research to allow reflection and critical discussion on initial findings with interviewees and national experts can help to increase the internal validity, as does a transparent account of the steps taken in the research design. A solid knowledge of the planning system under study and of the domestic language helps to avoid misinterpretation of analysis results and observed phenomena, and thus increases the construct and internal validity of the research. The best way to improve understanding of other planning systems is to spend part of one’s life in these other countries and to know the language so as to avoid misinterpretation of planning terms and actions and to be able to interpret them correctly within their institutional context (Masser 1986).

External validity relates to the question of whether, or to what extent, findings can be generalised. It is a challenging test for any qualitative social science research, but especially so if the research is concerned with analysing a planning culture or tradition, as it places great demands on the selection of cases. Moreover, it requires considerable knowledge of the context within
which planning takes place to determine whether the cases meet the requirements. For the research presented here, the cases chosen were expected to be representative of other strategic spatial plans in the same planning tradition. As the fourth test, the goal of reliability is to minimise the errors and biases in a study (Yin 1999). In an ideal scenario, another researcher following the clearly described research approach would arrive at the same result. In social sciences, characterised as it is by numerous external factors that are difficult (if not impossible) to control, such exact repetition can hardly be achieved, so instead researchers should strive to be as transparent as possible in their explanation of the research design as regards their choices in setting up the research and the justification of these choices. In the case of the research discussed in this chapter, the search for distinct patterns in comparison to other planning traditions was intended, rather than generalisation from the case studies within the country to the planning tradition per se.

**Data analysis and data representation: concluding remarks**

A cross-national comparative application of the framework to spatial plans from Germany, England and the Netherlands is reported in Dühr (2005, 2007, 2009) and readers interested in the findings are invited to consult these references. In this chapter, the focus is on the particularities of analysing data from a qualitative inquiry into planning maps in a comparative perspective. Language and terminology are an important consideration throughout. Terms commonly translated as 'local plan' or 'structure plan' usually refer to very different instruments in the different planning systems. The researcher interested in comparative planning analysis is therefore well advised to use planning terms in their original language and explain, rather than translate, them to avoid misinterpretation.

Evidence collected from the use of the analytical framework for the comparison of the layout and content of cartographic representations in strategic spatial planning was recorded in a matrix according to the criteria identified in Tables 3.6.1 and 3.6.2. On the basis of these 'raw' data, the findings are easily combined and synthesised in diagrams and tables. Such an approach allows one to communicate the qualitative character of the data through representations that contain no watertight boundaries but show the fluid nature of the analysis (see for an example Figure 3.6.1).

There are significant differences in the understanding of planning in different European countries, and this also affects the content and design of spatial policy maps. The role of a plan in the system and the underlying planning concepts determine both what is visualised and how it is visualised. In this chapter, an interpretivist approach to the analysis of spatial planning maps was proposed, based on an analytical framework that draws on elements from planning theory and cartographic theory and allows the unravelling of the 'hidden text' within maps.

In many planning traditions, a deeply rooted acceptance of certain cartographic styles that are considered 'scientific' and seen as communicating reliability and trustworthiness for lower planning tiers and the public still seems to be widespread (Dühr 2007). This is surprising given the increasing recognition of the political and communicative dimension of planning, which – it is safe to assume – also leaves its mark on important communication instruments such as maps. The view of maps in general as being rational and scientific is moreover astonishing given the numerous choices and selection and schematisation procedures that each map undergoes in its process of preparation, with each step offering plenty of room for dominant interests to be pronounced and other aspects being neglected, and decisions on what to depict often driven by the availability of spatial data rather than balanced considerations.
In transnational planning processes, where competences for spatial development are usually shared and policy is indicative and non-binding, such a belief in certain cartographic styles and their ‘trustworthiness’ can lead to serious misunderstandings among different planning cultures. Breaking through these underlying assumptions to raise the awareness that every cartographic representation is invariably a selection and interpretation of reality, and that policy maps in particular present political choices and preferences will require much effort. It is not facilitated by far-reaching reforms in many European planning systems over recent years, which have introduced new planning instruments and procedures without the accompanying and necessary reflection on deeply rooted assumptions about power and communication in planning processes and in plan maps in particular. However, for planning researchers, analysing the role of maps in planning processes at different spatial scales can offer a promising avenue to understand the core of a planning culture, to investigate how decisions over spatial futures are communicated and power is exercised in planning processes, and to better grasp current changes following reforms of planning systems and wider socio-economic and political trends in Europe and beyond.

Figure 3.6.1 Varying concepts and representations according to countries’ planning processes.
References


