Chapter 8
Evaluating Resilience in Planning

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8.1 The Evaluation of Planning

The first part of this chapter introduces the theme of planning evaluation from three different perspectives: an assessment of different planning documents, such as policies, programmes, plans and projects (PPPP); an appraisal of planning processes and practices in the implementation of these documents; and finally, an analysis of the actual results of planning activity on territory and society. The second part discusses how resilient thinking in planning can be evaluated by assessing to what extent planning is able to adapt to new conditions in coping with and managing change. This is a rather pertinent issue, in that despite the increasing presence of resilience on the planning agenda, evaluations of resilient-based planning in literature are notably absent. The final part of this chapter proposes a method of evaluation, identifying its main influences and describing in considerable detail each step in the assessment procedure. The method is applied to case studies in Lisbon, Oporto, Istanbul, Stockholm and Rotterdam in Chaps. 9–13, presenting context-based extensions of variegated forms of this methodology.

8.1.1 Evaluating Planning Documents

Planning evaluations first came into use in the 1950s, when the rational paradigm was dominant in planning theory. In the beginning of the second half of the twentieth century, as is still the case today in many different contexts, evaluations of planning

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took the form of ex ante assessments of planning documents. This focus on the preparation stage is one of the most significant differences between the evaluation of planning and the evaluation of social programmes, where the ex ante stage is usually devaluated due to the supposed difficulties within social sciences in providing a reliable forecast (for more on this issue, see Lichfield (2001) and Lichfield and Prat (1998)).

Under the rational paradigm, the decision-maker would, when faced with a specific planning situation, assess all possible courses of action towards a number of established ends, identify and assess the consequences of each course of action adopted and then select the most preferable alternative.

Throughout the second half of the twentieth century, largely bounded by this rational paradigm, many different evaluation methods were proposed, including cost-benefit analysis, planning balance sheet analysis, goals-achievement matrix, multi-criteria evaluation and environmental impact assessment, to name just a few. Comprehensive reviews and systems of classification of ex ante methods of evaluation can be found in Alexander (2006), Lichfield (1996), McAllister (1982) and Söderbaum (1998).

Alexander (2006) proposes a system of classification based on the type of rationality associated with each view of ex ante evaluation: (1) instrumental rationality, corresponding to the logic of choosing the best means to achieve a particular goal; (2) substantive rationality, demanding consideration of the goals themselves, selecting between objectives and assigning priorities; (3) bounded rationality, providing a context for decision-making; (4) strategic rationality, making the decision-maker and other actors interdependent; and, finally, (5) communicative rationality, shifting the focus from decision-making to social interaction. Alexander (2006) associates instrumental rationality with cost-benefit analysis; substantive rationality with planning balance sheet analysis, multi-criteria evaluation and environmental impact assessment; and, finally, communicative rationality with some forms of multi-criteria evaluation and environmental impact assessment.

Lichfield (1996), in reviewing the "evaluation prior to plan implementation", asserts the existence of four different types of methods. This typology is based on the following questions: (1) Does the method relate to inputs or outputs? (2) Are the inputs and outputs measured in quantity or money? (3) Are the criteria for choice expressed by a number, or by a number reflecting a monetary value? and (4) Do they relate to single or multiple sectors of the community? The first group, designated as "outputs only", includes nine methods, such as checklist of criteria, goals/objective achievement, impact assessment and multi-criteria evaluation. The second group, denominated as "inputs only", comprises three methods: unit cost, threshold analysis and costs in use. The third group, designated as "both output and input", includes methods such as cost-benefit analysis/single objective, social cost-benefit analysis/multiple objectives and planning balance sheet analysis. Finally, the fourth group, denominated as "both input and output in greater width", includes evaluation in structure planning, evaluation in inner cities and strategic choice.

McAllister (1982) analyses a set of evaluation methods, namely, cost-benefit analysis, planning balance sheet analysis, goals-achievement matrix, energy analysis

and land suitability analysis, identifying their main differences and similarities. He sustains that no single method can be claimed as superior, arguing that planners should have a solid understanding of the strengths and weaknesses of each method and should use them as mechanic uses his toolkit, selecting the most suitable set of techniques to address the problem at hand.

Söderbaum (1998) uses the degree of aggregation to identify three different groups, being highly aggregated methods, intermediate methods and highly disaggregated methods. The highly aggregated methods intend to sum all impacts in terms of a single value. This implies the existence of consensus in society about specific valuation rules. Cost-benefit analysis is a clear example of this group of methods – with focus on the quantitative ratio of benefits and costs. It is essentially a monetary method, even when nonmonetary impacts are considered. Intermediate methods also use a single quantitative indicator to express the overall utility of an alternative, but in this case, the indicator has a composite nature that reflects different dimensions. According to Khakee (2003), while these methods have been in regular use in recent years, they have come up against increasing criticism for not paying sufficient attention to the conflicting values of individuals. Planning balance sheet analyses and certain multi-criteria evaluations can be classified as intermediate methods. Highly disaggregated methods are intrinsically multidimensional; rather than showing the overall value of the plan, they make an assessment of the different impacts with the intention of stimulating interactive discourse, thus facilitating consensus building. The design of these methods adapts in line with the changing contexts, and so not only are the results important but also are the ways in which they arrived at. These methods combine inductive and deductive analysis and make use of quantitative and qualitative information (Khakee 2003). This third set of methods also includes environmental impact assessment.

8.1.2 Evaluating the Implementation of Planning Documents and the Planning Processes

The focus of planning evaluation may not be confined to the content of the document but may also look at what happens to this document throughout the planning process. This view corresponds to a performance view to evaluation. This view follows on from the definition of the planning document as a decision framework, and its performance in fulfilling this role defines its usefulness. It is important to understand if, and under what conditions, the planning document was consulted before making subsequent decisions.

Based on the work of Fudge and Barrett (1981), the Dutch school of planning evaluation has been conducting a continuous research from this perspective (see, e.g. the set of papers gathered in Environment and Planning B: Planning and Design 24[6], introduced by Mastop (1997)). Faludi (2000) and Mastop and Faludi (1997) claim that strategic plans – as opposed to project plans – should provide a frame of reference for operational decisions and do not necessarily have to produce direct

impacts on the physical development process. As such, the evaluation of strategic plans should correspond to a detailed analysis of the decisions and actions of a number of actors that are supposed to receive the plan messages.

Faludi (2006) extends further the performance-based approach to the evaluation of the European Spatial Development Perspective (ESDP). Drawing on the distinction between planning as a technical exercise and as a learning process, the author contrasts the concept of the "application" of plan messages with the traditional concept of plan implementation and presents a method for evaluating the success of the former. In the context of policy implementation analysis, Stame (2008) proposes the concept of "promotion", which is somewhat similar to Faludi's concept of "application". The purpose of applying ideas in such a document as the ESDP is to provide professionals involved in European spatial planning processes with a better knowledge of their working contexts and of the directions to follow.

Rivolin (2008) builds upon the idea of "performance of plans", coming up with the "performance of planning systems" concept. He sustains that the main question is not whether performing strategic plans are preferable to conforming regulative plans, but how the strategic and regulative functions of the planning activity should be differently correlated in a planning system aimed at performance rather than conformance.

8.1.3 Evaluating Planning Results on Territory and Society

Another approach to planning evaluation, the so-called conformance-based approach, considers that planning activity should be object-oriented and should focus on the actual results on the environment. From this standpoint, planning documents, and particularly plans, are considered as guides for future development. One major concern is the implementation of planning documents and, fundamentally, the link between planning documents and the outcomes on the ground.

Following on from the publication of a number of fundamental researches at the end of the 1970s (Alterman and Hill 1978; Calkins 1979) and in the second half of the 1990s (Baer 1997; Talen 1996, 1997), a number of interesting studies on this topic have been produced over the last decade, mainly in the United States, some of which are presented in brief in the following paragraphs.

The Plan Implementation Evaluation (PIE) presented by Laurian et al. (2004) is a conformance-based methodology that relies on an analysis of plans and planning permits and offers a rigorous, quantitative and systematic way of assessing the degree to which land-use plans are implemented. Plan implementation is defined as the degree to which plan policies are implemented through the application of specified development techniques in planning practice and is measured in two aspects: "breadth" and "depth". The Plan Implementation Evaluation method has been applied to six New Zealand plans and to almost 400 land development permits, with particular focus on storm water and urban amenity management. Brody et al. (2006a) examined the spatial pattern of wetland development permits in Florida,

verifying its conformance with the proposals of the local plans. The authors analysed how and where wetlands have developed over a 10-year period, whether wetland permits were clustered in areas designated for high-density development, whether they deviated from the plan's original spatial designation, and whether the quality and content of the original plan related to its degree of implementation. In another paper, Brody et al. (2006b) used the same methodology in order to analyse the effective influence on the territory of five sprawl-reduction planning policies included in local plans.

In 2008, Chapin, Deyle and Baker published two papers on the evaluation of planning policies to reduce exposure to hurricane flooding (Chapin et al. 2008; Deyle et al. 2008). In the former article, a parcel-based GIS method for measuring land-use changes, as the basis for an assessment of the implementation of local land-use policies, is presented; while in the latter, Deyle et al. (2008) explored the relationships between the process of implementation and the quality of the maps and policies of local plans.

8.1.4 Evaluating Planning Activity as a Whole

The evolution of planning theory and practice has been a complex process, comprising the successive proposal and coexistence of different approaches and paradigms – from the survey analysis plan to the rational comprehensive approach and from a decision-centred view of planning to communicative planning. This type of evolutionary process seems to suggest that planning is too complex to be explained in a single paradigm.

In recognition of the complexity and uncertainty of both planning and planning evaluation, a number of integrated approaches have been proposed. Alexander and Faludi's (1989) proposal integrates three views of the planning process with their associated criteria of plan quality – planning as control of the future, as a process of decision-making under conditions of uncertainty and as a middle ground view. These authors propose the policy-plan/programme-implementation-process (PPIP) model, providing five criteria for comprehensive evaluation: conformity, rational process, optimality ex ante, optimality ex post and utilisation. Alexander (2000) proposes a "contingent framework", integrating four different paradigms and various forms of rationality, with each of the complementary paradigms involving different actors undertaking different actions in the various stages of the planning process.

Oliveira and Pinho (2009, 2010a, b) propose the plan-process-results (PPR) as a methodology for evaluating plan implementation, also addressing the more comprehensive planning process in which each plan is incorporated and its contribution to city building. It seeks to provide a better understanding of the functioning of local planning practices, thus contributing to their development and improvement with the inclusion of a strong morphological dimension. It holds three generic dimensions – rationality, conformance and performance – and nine specific criteria, namely, interpretation, relevance, internal coherence, external coherence, participation in plan making and plan implementation, effectiveness, commitment of

resources, direction and plan utilisation. It uses a number of different techniques, such as impact matrices, SWOT analyses and morphogenetic analyses. This methodology was applied to the municipal plans of Lisbon and Oporto.

Altes (2006) compares the conformance-based and performance-based approaches in a case study of the Dutch national urban concentration policies. An application of the former concept reveals that the urban containment policies conform well to the plan. Nevertheless, in the context of the current stagnation in housing production, these policies have not been able to improve the decision-making process. In this sense, the author argues that plans with high conformance do not necessarily perform well.

Berke et al. (2006) explored and compared these conceptions of success in planning in the same way, concluding that plan implementation in New Zealand is weak. If implementation is defined in terms of conformance, plans and planners have an important influence on the implementation success, but if it is defined in terms of performance, plans and planners can be considered as less influential.

8.2 The Evaluation of Resilience Thinking in Planning

Debates on the different dimensions of the resilience concept since its formulation and the main developments in ecology and socioecological systems (Holling 1973, 1996; Scheffer et al. 2001), including the most recent developments in the planning field,[1] have been assigned increasing importance in congresses, for example, the annual conference of the Association of European Schools of Planning, or in scientific journals such as Built Environment, European Planning Studies and Urban Studies, as presented in different parts of this book. This section focuses exclusively on the recent efforts to evaluate resilience, both from a narrow planning perspective to a wider point of view that brings together environmental, societal, economic and governance issues.

In recent years the concept of sustainability has grown to attain a fundamental place in debates on planning evaluation through the steady incorporation of socio-environmental principles into the field (see, e.g. Dovlen and Hilding-Rydevick 2008 and Stenberg 2008); the development of evaluation theory, including normative contexts (Girard 2006; Söderbaum 1998); and the design of methods, techniques and indicators (Lombardi 1998; Bauler et al. 2008). In addition, sustainability assessment has recently emerged as a specific tool in the attainment of sustainability, including a broad range of approaches, such as environmental impact assessment and strategic environmental assessments (see Pope et al. 2004). In the United Kingdom, sustainability appraisals, mandatory since 2004, have been used to promote sustainable development through the integration of social, environmental and economic considerations into the preparation of plan revisions.

[1] The linkage between ecology and planning has been proposed and developed over the last four decades, from Holling and Goldberg (1971) to Pickett et al. (2008).

The inclusion of resilience thinking in planning evaluation, on the other hand, has been far more modest. As such, the design of the evaluation methodology in this book, with a clear innovative character, required a search for frames of reference in a wider context. The following sections present a number of evaluation frameworks and methodologies, sourced from socio-environmental system literature and from planning literature.

8.2.1 Analysing Resilience in Socioecological Systems

Carpenter et al. (2001) identify three different levels of meaning for resilience – as a metaphor related to sustainability, as a property of dynamic models and, most importantly, as a measurable quantity that can be assessed in field studies of socio-ecological systems. The authors highlight that the assessment of system resilience presupposes the identification of the system configuration and of the disturbances. In their study, the resilience properties of two contrasting systems – lake districts and rangelands – are compared in two case studies.

Walker et al. (2002) present an evolving approach to analysing resilience in socioecological systems, as a basis for resilience management. The authors propose a framework of four steps involving close coordination among the stakeholders of the systems: (1) a stakeholder-led development of a conceptual model of the system; (2) the identification of the range of unpredictable and uncontrollable drivers, stakeholder visions for the future and contrasting possible future policies, weaving these three factors into a limited set of future scenarios; (3) the exploration of the systems for resilience in an iterative way; and, finally, (4) the stakeholder evaluation of the process and outcomes in terms of policy and management implications.

Acknowledging the difficulties faced in operationalising resilience theory and in developing and testing empirical hypotheses, Bennett et al. (2005) present a method in which simple system models are used as a framework for identifying resilience surrogates for case studies. The construction and analysis of simple system models provides a useful basis for guiding and directing the selection of surrogate variables, offering empirical measures of resilience.

In recent years, the Resilience Alliance has led researches on resilience in social-ecological systems. In 2007 this multidisciplinary group prepared two workbooks, one (more comprehensive) for practitioners and the other (more concise) for scientists, to assist in the assessment of resilience in social-ecological systems (Resilience Alliance 2007a, b). These books offer guidelines for the undertaking of evaluations of the resilience of natural resource systems in five parts: (1) a definition of the system under analysis (and of disturbances), (2) an identification of alternate states and thresholds, (3) an evaluation of dynamics based on system cycles, (4) an inquiry into the adaptability of the system and, finally, (5) a guidance for planning interventions.

Tanner et al. (2009) propose an analytical framework that combines governance literature with rapid climate resilience assessments conducted in ten Asian cities. The authors argue that a number of key characteristics can be identified to assess

and build urban resilience to climate change in a way that reduces the vulnerability of citizens at risk from climate shocks and stresses. These characteristics form the basis of a climate-resilient urban governance assessment framework and include (1) decentralisation and autonomy, (2) accountability and transparency, (3) responsiveness and flexibility, (4) participation and inclusion, and, finally, (5) experience and support. This framework can assist in planning, designing and implementing urban climate change resilience-building programmes for the future.

8.2.2 Methodologies for Evaluating Resilience in Planning

As mentioned above, methodologies for the evaluation of resilience in the planning field are not as common as in socioecological systems. Drawing upon previous attempts to evaluate planning sustainability, Nijkamp and Finco (2009) propose a framework, a multi-criteria evaluation method and a set of indicators for the assessment of resilience strategies (considered as a basic condition for the achievement of urban sustainability). With the help of two case studies, the Italian city of Cremona and the Dutch city of Enkhuizen, a typological framework for classifying urban sustainability cases is provided.

Bonnet (2010) proposes a methodology for evaluating the functional resilience of territories and, more particularly, the networks of local firms. The methodology involves the modelling of networks using graph theory, based on data collected from a statistical survey of a sample of firms and a list of shared patents pending. The application of the methodology to the Montpellier urban area in France revealed the existence of pivotal firms within the network that played an important role in the resilience and spatial organisation of the territory.

Stevens et al. (2010) propose a framework for evaluating the ability of planning proposals to create disaster-resilient communities. The framework is applied, using methods such as multiple regression analysis, to a set of 33 developments, including conventional low-density and new urbanist high-density areas located on floodplains to assess which is incorporating a higher percentage of hazard mitigation techniques. The assessment revealed that new urbanist developments performed better, not due to the quality of the proposal but to increased local government technical assistance in the review.

8.3 A Methodology for Evaluating Resilience Thinking in Planning (RTP)

This section presents a new methodology to evaluate resilience thinking in planning (RTP), designed by the CITTA researchers Paulo Pinho, Vítor Oliveira, Sara Santos Cruz, Silvia Sousa and Ana Martins. This methodology draws on work both from the socio-environmental systems (particularly on the research developed by the

Resilience Alliance) and from the field of planning evaluation (particularly on the policy-plan/programme-implementation-process method designed by Alexander and Faludi (1989) and on the plan-process-results methodology, conceived by Oliveira and Pinho (2009)). As the two former methodologies, RTP considers planning activity as a whole, focusing on planning documents, both at preparation and implementation stages, and on their effects on the territory and society. As such, it can be distinguished from the methods presented in Sect. 8.1 exclusively focused on the preparation of planning documents or on their implementation.

One main concern in the design of the methodology was to make it as simple as possible, easily applicable and open to future comparisons. This is particularly important, since the objects of analysis of the methodology, such as policies, programmes, plans and projects, may differ across different case studies. Chaps. 9–13 present an application of the differentiated forms of methodology in five different European cities.

8.3.1 The Assessment Procedure

The methodology for evaluating resilient thinking in planning (RTP) follows seven fundamental stages:

Stage 1: Identification of key territorial issues
Stage 2: Selection of relevant planning documents
Stage 3: Identification of resilience-related policies and measures
Stage 4: Selection of appropriate resilience attributes
Stage 5: Formulation of the evaluation questions
Stage 6: Selection of the dimensions of resilience and corresponding indicators
Stage 7: Synthesis and critical appraisal of the evaluation results

The first stage comprises the identification of the main territorial issues to be taken into consideration and the identification of the changes and transformations that have occurred in the study area, be it the city, metropolitan area or city region. These shall be the key issues to be addressed in the evaluation exercise. These issues stand out from the normal trends of the urban system and as such can be referred to as changes or disturbances, as discussed in different parts of this book. The key issues affecting the territories under analysis can be, for example, declining city centres (see Chap. 9 for the Lisbon case and Chap. 10 for the Oporto case) and rapid urbanisation processes (see Chap. 11 for Istanbul), to name just three.

The second stage of the assessment procedure involves the selection of the main planning documents focusing on the key issues identified in the first stage and, particularly, the identification of the fundamental concerns expressed in these planning documents. The policies and measures explored in the planning documents (selected in stage 2) correspond to the third stage. These policies and measures are the main object of analysis.

The fourth stage of the assessment procedure involves the selection of the policies and measures that can be evaluated under the framework of the resilience concept. Policies and measures are selected according to this concept, identifying how the objectives and the proposed actions might contribute to a more resilient city.

The fifth stage corresponds to the identification of the resilience attributes that are most suited to the specific case under analysis, and to the formulation of the evaluation questions. The perspective of analysis of the resilience concept can be strengthened through the consideration of the most relevant attributes towards achieving sustainable land-use policies. The rationale for the selection of these attributes considers that:

- The attribute must reflect a positive quality ("the more the better").
- The attribute should reflect a dynamic perspective, so that gains and losses can be easily identified.
- The attribute should be able to equally cross four selected dimensions (following the Resilience Alliance 2007c): economic, social, environmental and governance.
- The attribute should be defined so that overlaps are avoided as much as possible.

In practice, the selected attributes can have different weights. For each case study, several attributes are to be considered through an evaluation of selected planning documents (policies, programmes, plans and projects). These attributes, which are discussed in detail in Chap. 3, are recovery, connectivity, capital building, adaptability, robustness, flexibility and transformability. Each attribute should correspond to an evaluation question, with the intention being to explain how that particular attribute will be considered. The corresponding evaluation questions are as follows:

1. *Recovery:* Are the policies, programmes, plans and projects promoting capacity in the territory to respond to and recover from disturbance?
2. *Connectivity:* Are the policies, programmes, plans and projects enabling an interrelated territory, in which the nodes of the network are effectively linked?
3. *Capital building:* Are the policies, programmes, plans and projects under analysis contributing to the build-up of capital (stock), reinforcing in this way the stability and cohesion of the territory?
4. *Adaptability:* Are the policies, programmes, plans and projects enhancing the adaptability of the territory and its capacity to adjust to change in a reactive way?
5. *Robustness:* Are the policies, programmes, plans and projects increasing the robustness of the territory to unforeseen shocks and disturbances?
6. *Flexibility:* Are the policies, programmes, plans and projects enhancing the flexibility of the territory and its capacity to react to change in a proactive way?
7. *Transformability:* Are the policies, programmes, plans and projects contributing to the transformability of the territory and to its ability to innovate and create a new system should the previous become no longer viable?

The sixth stage of the assessment procedure involves the selection of the relevant dimensions of resilience and the measurement of the corresponding indicators in both the formulation and implementation phases of the planning documents. An evaluation of the formulation of the planning documents should provide an

indication of the internal cohesion of the plan, as well as its consistency and coordination with other instruments. The evaluation of the implementation of the planning documents should be able to focus on the transformability of the territory and on planning practice, meaning that whenever possible, both the conformance and performance of policies should be evaluated. Similar to the Resilience Alliance (2007c), the RTP defines four fundamental dimensions: economic (considering both macro and micro components), social (including cultural components), environmental (the natural and built environment) and governance (public and private). An assessment of these dimensions and components involves the use of different indicators at different scales – national, regional and local. Generally speaking, the indicators should be easily measurable and available, quantitative or qualitative, reduced in number and wisely chosen to ensure good representation.

The last stage of the assessment procedure should provide a critical appraisal of the applicability and usefulness of the resilience concept to the case study under analysis with the help of indicators. The evaluation framework should offer sound measurements for assessing whether the resilience concept is useful in understanding the policies, and supplying guidance to address economic, social and environmental changes to enhance sustainability.

8.4 Conclusions

This chapter has argued in favour of a systematic evaluation of resilient thinking in planning, which is an issue that as yet is not fully integrated into current debates in planning. It is suggested here that an evaluation should constitute a cyclical process with a balanced development over time, should focus on the different aspects of planning and should be able to provide principles and guidelines for promoting resilient urban areas.

The results of the application of the methodology – both in the more theoretical or more contextual forms, leading to different emphasis on the territory, the planning framework or the disturbance itself – to each case study should enhance its ability to endure future shocks and disturbances, regardless of the unexpected forms that they may take, and contribute to the theoretical and conceptual development of urban resilience. The following chapters should validate these statements.

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