ALBATROS D: A SYSTEMIC METHOD FOR PARTICIPATORY URBAN DIAGNOSIS

Gilles Desthieux[1], Catherine Merz[2], Flourentzos Flourentzou[3], Laurent Chenu[4], and François Golay[5]

ABSTRACT

The method *Albatros D* (D as Diagnosis), presented in this article, aims to develop a structured method of diagnosis. It integrates sustainable development stakes at the beginning of the planning stage of public infrastructures building, renovation or abandon. The method is innovating by providing decision aiding and IT tools, based on qualitative multricriteria and systemic modeling; this, in a stage of project where information level is at minimum and action margin at maximum. *Albatros D* emphasizes two crucial aspects of diagnosis: definition and justification of the needs or motivation of a project; formalization of the stakes of the project. It is intended to be participative, by trying to integrate most of concerned stakeholders (residents, public officers, policy-makers and scientists). We particularly distinguish two components of the diagnosis: the assessment of the current state of an urban system by using indicators (appraisal) and the comprehension of the system process by identifying causal relationships between indicators. A Web interface tool is developed to help such a comprehension. The method is being validated on mandates given by Swiss governmental offices. On-going results of these applications are presented.

KEY WORDS

Diagnosis, Urban planning, Systemic modeling, Web database (php/MySQL), Participatory approach

[1] Research Engineer, PhD, Geographical information systems laboratory, Swiss Federal Institute of Technology, EPFL - LASIG, Station 18, CH-1015 Lausanne, Switzerland, Phone +4121 6935784, gilles.desthieux@epfl.ch

[2] Architect, Laboratory of architectural and environmental physics, School of Engineering Geneva (EIG), rue de la Prairie 4, CH-1202 Geneva, Switzerland, Phone +4122 3380679, catherine.merz@hesge.ch

[3] Engineer, PhD, ESTIA SA, Parc Scientifique de l'EPFL (PSE), CH-1015 Lausanne, Switzerland, Phone +4121 6938303, flou@estia.ch

[4] Architect, Atelier d'architectures Laurent Chenu, bd James Fazy 3, CH-1201 Geneva, Switzerland, Phone +4122 7869885, lchenu@swissonline.ch

[5] Professor, Geographical information systems laboratory, Swiss Federal Institute of Technology, EPFL - LASIG, Station 18, CH-1015 Lausanne, Switzerland, Phone +4121 6935781, francois.golay@epfl.ch

INTRODUCTION

Contradictory evolutions of social, politic, economic and environmental phenomena highlight the complexity of the urban dynamics (Debarbieux et Vanier, 2002). The acceleration of these evolutions makes it difficult their appropriation by the groups of concerned stakeholders, which results in frequent oppositions to projects of land use planning and environment management. Traditional instruments are seldom adapted to these challenges, as they are often founded on sector- and expert-based approaches. In order to unblock conflict resolution, integrated and participatory approaches are gaining importance in urban projects. But they are still lacking in the early stage of decision processes. The project ***Albatros D*** (D as Diagnosis), presented in this article, aims to fill these gaps by developing a structured method of urban diagnosis. It results from a cooperation between the academic world and industry and is intended to support public administrations in their planning tasks. In this perspective, the method is being validated on public mandates.

We start from the problematic of the decision making and the need of reinforcing the problem setting phase. Then we describe the Albatros methodology and a Web tool for its support. Finally we shortly enounce the various mandates without presenting the results in details as they are still partial.

PROBLEMATICS

The decision is not a matter of only choosing the best alternative, but it is before all a process through which it is built progressively (Isla 2000). In this way, Simon (1977) proposed a model of decision which is made up of four phases: intelligence, design, choice and review. The motivation for change or act is built during the first phase, which corresponds to the *problem setting* (Fareri 2000, Söderström 2001). Whereas the decision is built during the next three phases, corresponding to the problem solving.

Land use and building projects generally “jump to solutions” without defining adequately the problem to solve (Stave, 2002). Yet several authors agree that the phase of problem definition or intelligence is crucial for the decision process (Vennix 1999, Stave 2002; Antunes 2006); this, particularly in messy problems, i.e. a situation in which opinions among stakeholders involved in a decision process differ considerably on the issues (Vennix, 1999).

More precisely, such a lack is due on the one hand to the insufficient definition of the public interest, that are the stakeholders concerned by the decision, the stakes or aspects of the problem that need the most attention and the goals. Indeed, projects are elaborated and definitive options are taken by experts that focus on technical or architectural issues behind the scene (Söderström 2001). Whereas other stakeholders sharing other stakes (cultural, ecological, social, etc.) are excluded or only lately integrated, so that they cannot appropriate the project. To prevent such conflicts, it is important to make all concerned stakeholders discussing trough a deliberation process. This produces a common understanding of the issues by sharing experiences, opinions, stakes and values (Renn 2006, Hove 2006).

On the other hand, decision is not often based on relevant and synthetic information to measure key parameters associated to the stakes. If the chosen strategies in the intelligence phase are crucial in regards with the decision, paradoxically the action margin is still high

(Figure 1). The increase of information availability contributes to target the final decision better and thus to decrease its uncertainty (Wittmer et al. 2006).

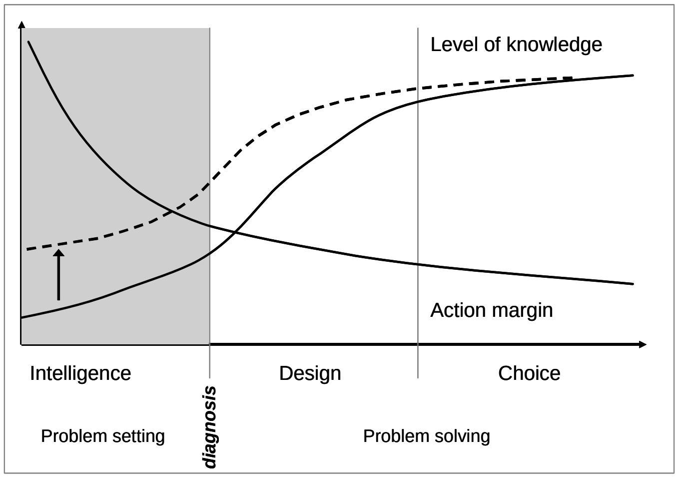


Figure 1: Evolution of the level of knowledge and action margin during the decision-making process.

A good definition of the public interest and the availability of relevant information make sure that the right problem is addressed (Antunes 2006). They contribute to justify the needs of a project. Indeed, some projects involving important means are abandoned later as they do not address real needs. People do not ever understand why actions or changes are necessary (Stave 2002). For this reason, Söderström et al. (2001) and Joerin et al. (2001) noted in Geneva in the 1990s that a lot of important land use and building projects were rejected by referenda.

Finally, the question is how to select adequate methods and instruments for the structuring of the problem setting and for the resolution of conflicts that already occur in this phase. Such instruments should combine analytical and participatory approaches to consider different values and interest (Wittmer et al. 2006). In this way, we propose a method of urban diagnosis with information tools. It aims at developing the comprehension of some issues in their globality and complexity. This comprehension activity should be relevant towards the decision (Hoc and Amalberti 1994).

METHOD ALABTROS D

OBJECTIVES

Albatros D consists in a structured method of diagnosis that aims at justifying and reinforcing the utility of building and land use projects from the planning stage. This method enables to discuss and formalize goals and stakes better. Thus it provides a more solid basis for the implementation of decisions and actions.

Albatros D emphasizes two crucial aspects of diagnosis:

- definition and justification of the **needs** or motivation of a project;

- formalization of the **stakes** of the project.

Albatros D is being used on mandates of infrastructures projects building, renovation or abandon given by Swiss governmental offices public. Some examples will be shortly given further after the methodology description.

STEPS OF ALBATROS D

The overall method is presented in Figure 2. First, stakeholders are invited to define their specific needs and stakes. We distinguish then two components of the diagnosis: the assessment of the current state of an urban system in regards with evaluation objectives (appraisal) and the comprehension of the system process. Particular attention will be devoted to the latter form of diagnosis, as it is not well developed in practice. The combination of these two components enables in the end the justification of the needs, the identification of priority stakes and strategies.

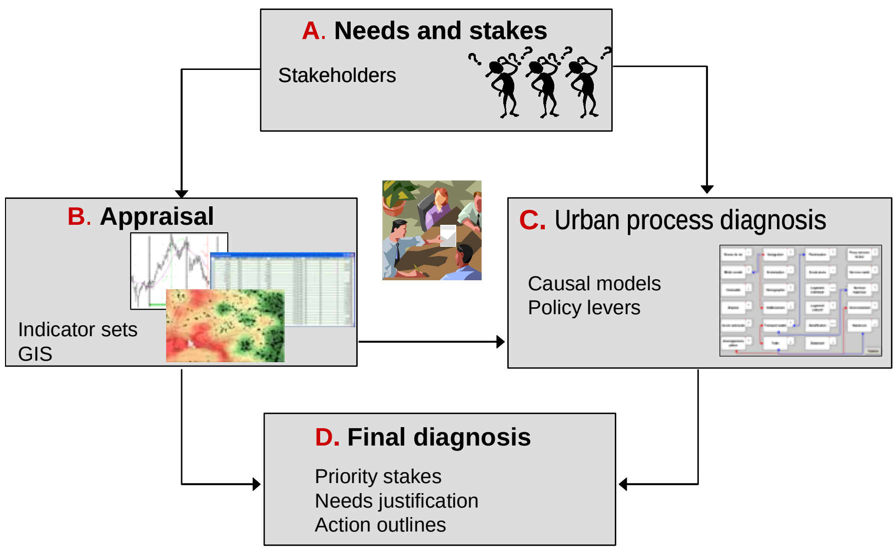


Figure 2: Method Albatros D

Public interest identification: definition of stakes and needs:

This preliminary step consists in collecting all the documents and former studies concerning the project in order to understand the context better. From that point, it is possible to define the components of the diagnosis, that is the phenomena to assess and the relevant information (indicators) to collect in the next step (appraisal). At the same time, interviews are undertaken with stakeholders taking part to an urban project, like representatives of institutions, citizens and associations. The interviews enable to set a shared vision of the problematic, to highlight various concerns and interests in terms of needs and stakes.

Concretely, we develop a Web interface for the support of the interviews. It collects and stores in a database the information given by the stakeholders. We use for that the PHP/MySQL technology that is easy to implement. In the first module, stakeholders are invited to qualitatively evaluate some indicators, the relevance of intervention to the corresponding real phenomena (Figure 3). We can then deduce the needs and stakes by considering the indicators where the current situation is seen as worrying ("unfavorable") and an intervention is wished.

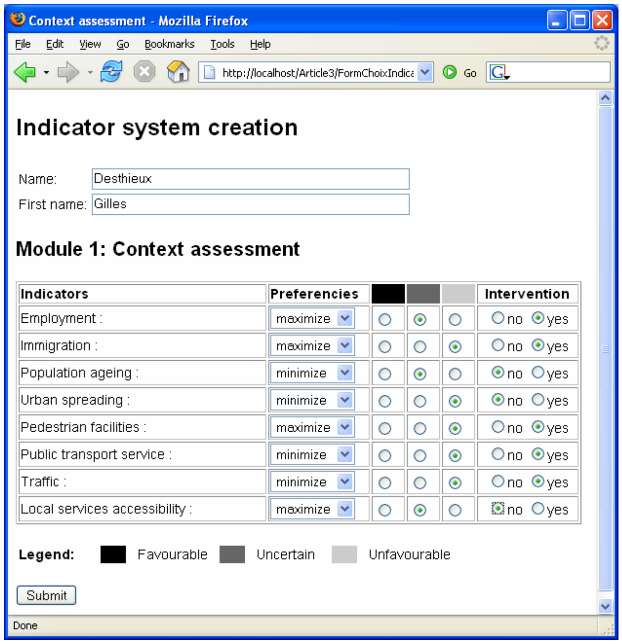


Figure 3: Web Interface, Initial context assessment. Example of indicators taken from a former study in Quebec (Desthieux et al. 2004)

Appraisal

The **appraisal** form of diagnosis is currently done in practice to gauge whether a project has achieved its goals (Bell and Morse 2000). It is facilitated by providing relevant information such as spatial (land-use), architectural, social and environmental indicators. These are evaluated by using GIS tools, audits, technical assessment on built structures, or socioeconomic assessment. Spatial information enables to describe the urban environment through among others, accessibility to services, mobility, connections inside a neighborhood and between neighborhoods, physical barriers, green spaces, nuisances. In this way, one of the authors took part to a participatory diagnosis process in Geneva, focusing on the use of similar spatial indicators (Nembrini et al. 2005).

Systemic diagnosis: to understand how the urban system is working

In the appraisal form of diagnosis indicators are simply juxtaposed and gathered in catalogues. This does not give an idea about complex dynamics of the urban area, on which actions generally rely (Desthieux et al. 2004). If one indicator shows a bad performance, the manager has no information on how and where to intervene in the system to make it evolving to the desired finality. In other words, if one indicator is improving, will the others improve or worsen? Therefore, we propose to go further by structuring and organizing indicators into a system and to establish, in the end, a **diagnosis of urban system process**. Such a diagnosis is based on the identification of causal relationships between indicators.

The relationships within an indicator system often result from the interpretation made by the expert. They are based on correlation tests. However, stakeholders do not ever limit their reasoning to what is scientifically validated. Every land use stakeholder, such as an inhabitant, an institutional manager or a scientist, intuitively perceives the urban system working (and relationship) by considering the interaction between phenomena. Everyone decides and act according to their own comprehension of the reality (Vennix 1999). Perceptions are not ever conscious and complete due to the complexity of phenomena (Kuipers 1994).

Consequently, we propose to develop a systemic framework that helps stakeholders showing perceived or supposed relationships between indicators and eliciting their comprehension of the urban complexity.

By referring to the *group model building* theory, the participatory identification of causal relationships give the following opportunities (Antunes et al. 2006, Stave 2002, Vennix 1999); it:

- offers a rigorous framework to define the scope of the problem and to identify the relationships between the elements of the problem ;
- helps individuals making their mental models and preferences explicit and communicating them to others.
- supports the early involvement of stakeholders in the decision-making process ;.
- contributes to the integration of partial representations and promotes consensus by developing a mutual understanding of the problem.
- helps identifying policy levers, that is, the elements where to intervene in priority in the system to reach goals. These policy levers facilitate finding solutions to problems.

The identification of the causal relations is done through the interviews with stakeholders. The Web interface presented before provides a second module to collect and store the relationships in the database (Figure 4). This latter facilitates the assessment and the communication of the resulting models.

Relationships are designed as following. Indicators where intervention is wished in the module 1 are seen as possible policy levers (column ‘Action’ in the figure). It is asked to the stakeholder what does happen if these indicators evolve towards either an improvement (that means the indicator evolves towards the state *favorable*) or a worsening (towards the state *unfavorable*). Will such evolutions lead to change the situation of others indicators (column ‘Repercussions)? In which direction (worsening or improvement)? For instance, the improvement of one state in the indicator Pedestrian facilities causes the improvement of one state in the indicator Local services proximity.

In Figure 4, the indicator name boxes are colored according to the initial situation given in the module 1. The improvement evolution is symbolized by ‘+’ and the worsening by ‘-‘. The situation of the indicator is actualized according to the evolution.

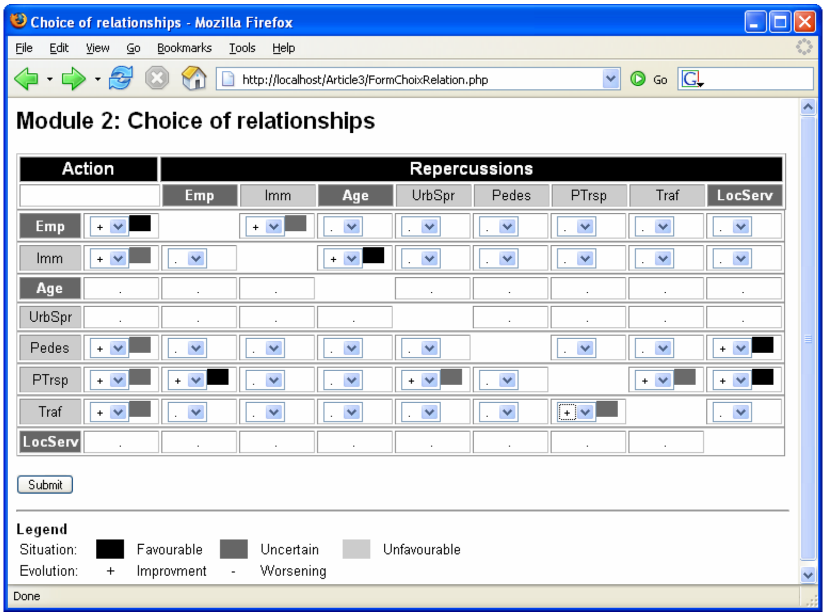
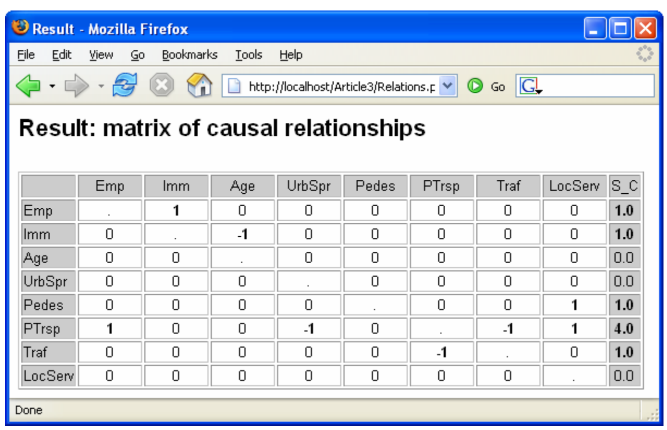


Figure 4: Module of relationships choice. Example of relationships taken from a former study in Quebec (Desthieux et al. 2004)

Once the user has filled the co-evolutions that he perceives, his model can be displayed in the causal matrix (Figure 5). To achieve this, the program transforms the co-evolution in relationships by considering the direction of co-evolution and the initial preferences of the indicators given in the module 1. The direction of the relationships are either concordant (symbolized by the value '+1' in the matrix), when the increase in an indicator leads to the increase in another, or discordant ('-1'), when the increase in an indicator leads to the decrease in another.



	Emp	Imm	Age	UrbSpr	Pedes	PTrsp	Traf	LocServ	S_C
Emp	.	1	0	0	0	0	0	0	1.0
Imm	0	.	-1	0	0	0	0	0	1.0
Age	0	0	.	0	0	0	0	0	0.0
UrbSpr	0	0	0	.	0	0	0	0	0.0
Pedes	0	0	0	0	.	0	0	1	1.0
PTrsp	1	0	0	-1	0	.	-1	1	4.0
Traf	0	0	0	0	0	-1	.	0	1.0
LocServ	0	0	0	0	0	0	0	.	0.0

Figure 5: Causal matrix. The value '+1' corresponds to the presence of a concordant relationship, '-1' to a discordant, '0' to an absence of relationship

By interpreting the matrix, a great number of relationships starting from an indicator confirms its importance as policy lever. This is calculated by the sum of columns (S_C) of the matrix. In other words such an indicator influences many other indicators. An action upon phenomena measured by this indicator will probably have important repercussions on the whole system. This is the case of the Public Transport in the example given above.

Finally, through integrating the individual models given by the stakeholders and considering agreement on relations and policy levers, we contribute to build an indicator system that shows a consensus on the representation of the urban complexity. However some divergences certainly remain and should be identified.

Final diagnosis

The combination of appraisal and systemic diagnosis enables the justification of the needs towards a project, the organization of the stakes into a hierarchy and the definition of action outlines.

In the appraisal, the interpretation of the indicators enables to highlight the strengths and weaknesses of a situation in regard with an urban project. In particular, it is possible to identify the components of the problem and the areas where interventions are justified. For instance, a map of traffic noise shows which housings necessitate protection. Or the assessment of the degradation of buildings gives ideas if they need to be renovated or rather rebuilt. In the end, indicators make participants revising their initial perspectives and attitude (Stagl 2006) and relativizing the importance of stakes by showing which are worrying.

The system model assessment gives another light about the priority stakes by considering the policy levers. It shows the possible consequences of actions by putting in relation the components of the problem: an action could have positive repercussion in a component and negative in another. For instance, the road network development leads to more opportunities in the region, but it encourages in the same time the use of private transports in the expense of public transports.

Finally, the diagnosis should enable to define strategies that answer questions like:

- What are the priorities, how to spread out actions in time and space?
- How to preserve and improve the quality of housing and environment?
- How to conciliate diverging interest in terms of land use?
- How to promote a consistent urbanization process?

APPLICATIONS

The method Albatros D is being partly or fully used on Swiss public mandates of infrastructures projects. We shortly present some of them:

- **Renovation of depredated social housing belonging to the City of Neuchâtel**: The first step is achieved. It consisted in interviewing the residents, in identifying their need of renovation and if they are willing to pay for this. The next step, i.e. the systemic diagnosis, will start soon. Some representatives of the city authorities will be interviewed by using the second module of the Web interface.

- **Sustainable development compass of the State of Vaud**: this mandate is achieved. It consisted in proposing a list of indicators and a computer tool to qualitatively gauge the impacts of projects or strategies in terms of sustainable development. The tool is similar to the module 1.
- **Development of an area of social housings in Geneva:** this mandate from a property foundation is about to start. It concerns a much more complex context than the others studies. It aims at defining a global strategy and a program planning of interventions to the housing areas in a participatory approach. The final goal is to give some recommendations that help the foundation to decide.
- **Green pathways, State of Vaud:** this mandate, that will start soon, aims at identifying natural landscapes that can be allocated to green pathways as tourist and relaxation areas for urban residents.

CONCLUSIONS

Albatros D is innovating by combining two complementary types of diagnosis – the appraisal and the diagnosis of urban process – and by implementing the concept of integration of information coming from the perceptions of stakeholders (social and politic legitimacy) and from indicators (scientific legitimacy) (Meadows 1998). Therefore, Albatros D contributes to consolidate and structure the problem setting better. It enables to spare time, energy and financial resources by targeting the decision scope and facilitating conflict resolution (early involvement of stakeholders). As several public offices perceived such interests, it seems that we are addressing real needs in terms of missing methodology.

For the support of the diagnosis we provided IT tools: GIS for the relevant use of information and for the understanding of spatial issues, and Web technology PHP/MySQL. This latter enables to create an interactive interface for the interviews and in the same time, for the storage and treatment of the collected information. We can envisage that the stakeholders use such an interface by themselves trough Internet. But we give more importance to discussion between the expert and the stakeholder, which brings richer information than a simple web consultation.

Some questions remain about the applicability and acceptance of the method. Among them, the diagnosis of urban process is still difficult to implement and its use in a participatory approach for the complexity understanging is quite ambitious. In a review perspective, the complete validation of the method in the public mandates will refine it.

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