

POLITECNICO DI TORINO
SECOND SCHOOL OF ARCHITECTURE
Master of Science in Architecture
Honors theses

PARTICIPATORY PLANNING AND SUSTAINABILITY: A PROPOSAL FOR A GEOGRAPHIC INFORMATION INTEREST VALUE FRAMEWORK WITHIN MCDA MANAGEMENT METHODOLOGIES IN THE CAREMA TERRITORY

by Carlos Armando Ruo Roch Molina Cansino

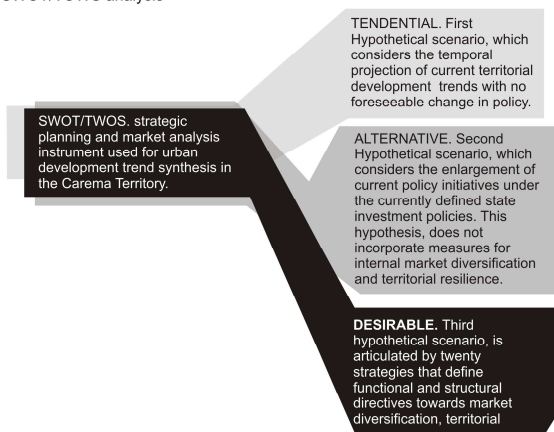
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Urban systems are the physical expression of the economic and political organization of society (Weber,1921). Like most dynamic systems, urban and regional systems they are highly complex and susceptible to structural and organizational shifts derived from systemic rearrangements in policy making and the emergence of new parametric variables to their constitutive behavior. Similarly, as in all organic systems, there are ecological, physical and institutional constraints that affect the behavior of internal economic relations to well-defined trends and interactions. In this sense, the compatibility between urban systems and ecologically sustainable systems (limited by definition by their own systemic capacities and organizational arrangements) is not necessarily guaranteed by the sole maxims of economic growth, technological innovation or any of the contemporary paradigms that have defined public policy in the last thirty years.

LEVEL 1. Intelligence

System definition and analysis
Decisional problem structuring
SWOT/TOWS analysis



LEVEL 2 Design

Generation of alternatives and assess impacts

1. Definition of Strategic Assets. identifies the arrangement of assets within the existent urban system, where systemic, shareholder and stakeholder interest value converges.

2. Stakeholder Analysis. structured in four phases for overall SH mapping, impact assessment and institutional analysis.

3. Functional Structure Definition. integrates functional attributes with specific systemic components and interest values, based on the

SHM
CIA/E
IADF
AHP.S

AHP

Stakeholder Mapping (SHM). Hypothesis definition for SH dynamics in the tendential and desirable scenarios.

Community Impact Analysis/Evaluation (CIA/E). Impact assessment and SH preference definition.

Institutional Analysis Development Framework (IADF). Analysis of institutional arrangements in preminent internal markets (traditional wine market specifically) including information and incentive structures in the Carema policy setting. Definition of hierarchical sectorial objectives per stakeholder groups.

AHP Synthesis. Integration of SH preference values for every single systemic function according to Saaty's(1990) synthesis aggregation model into institutional and sectorial weights.

LEVEL 3. Choice

Ranking of alternatives and program definition

4. Elicitation of alternatives. Aggregation of subjective and objective judgement evaluations from SH into a single composite indicator for every action undertaken in every systemic component.

5. Program Definition. Conflict mapping and hierarchical organization of strategic actions according to SH functional value judgements. Program definition may include the proposal of conflict

METHODOLOGY

Methodology levels according to the decisional process as defined by Simon(1960) and integrated to MCDA/MCDM methodologies by Nordström (2010)

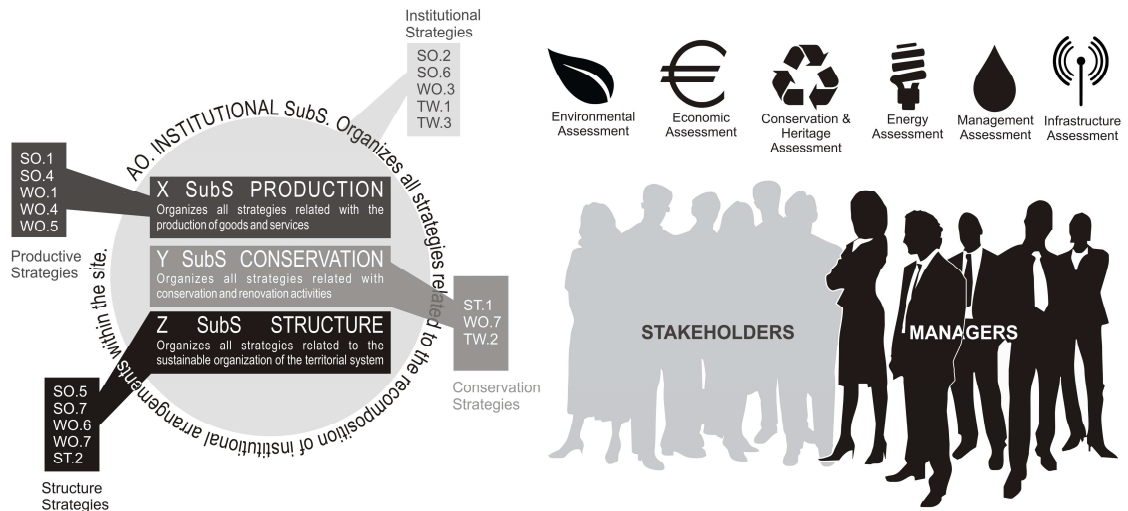
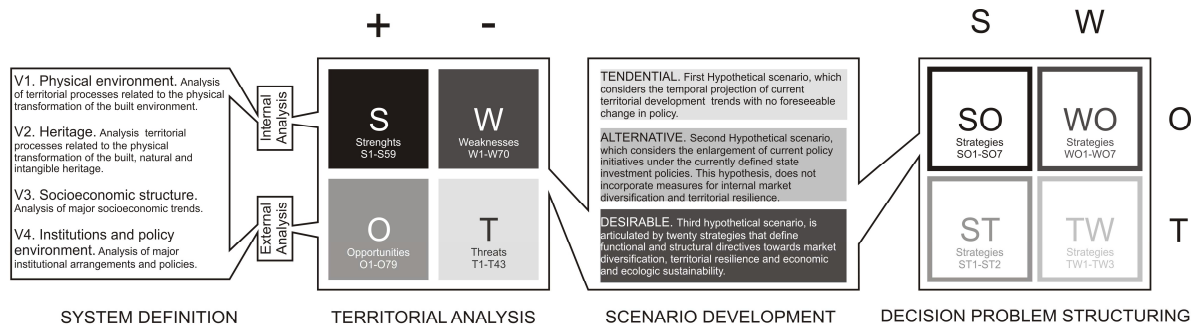
From an institutional perspective, the problem of adaptation to a new parametric production infrastructures and technologies seems to be determined by economic geography, linked necessarily to the political and socioeconomic dynamics of the nation-state which, through the management of labor capital relations, production and public policy, seeks to ensure institutional consensus and achieve practical goals of sustained, but not necessarily sustainable economic growth.

As demonstrated by the deep economic crisis in Europe, the design and implementation of integrative decision-making mechanisms and methodologies for territorial cohesion and management of resources within the framework European Union cohesion policies, has consistently deepened the structural differences between territorial states, profoundly changing their domestic markets (particularly in those in the so called “periphery”, Southern Mediterranean and Central Europe), and largely cementing the main causalities for the present financial crisis. Prospective change for the current European urban and regional reality (greatly transformed by the implementation of this specific model of growth and spatial development) requires a profound reorganization of institutional dynamics and the structuring of effective, democratic models of territorial cohesion and sustainability.

The thesis presented in this research proposes a decision-making architecture and methodology for Carema, in the northwestern Piedmont province, as a technical alternative to European Union mechanisms for integrated planning and financing. This specific application, restrained by a particular territorial scale and special market and spatial conditions, develops from a comprehensive analysis of overall socioeconomic trends and regional particularities and the definition of multiple solution scenarios, including a desirable scenario where economic and ecological sustainability is achievable.

Certainly this assessment is constrained by contemporary economic and urban theory and the particular structure of local and regional markets. Nevertheless the decisional optimization structure and Multicriteria Decision Analysis/Method (MCDA/MCDM) framework proposed takes into account this morphological and institutional constraints and structures an action program for the development of sustainable growth conditions and the overall recovery of natural, physical and intangible heritage.

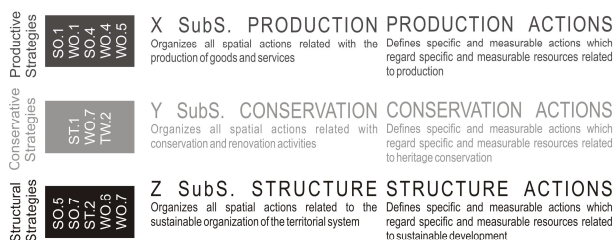
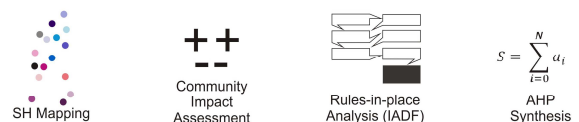
The proposed decisional architecture also defines a system of strategic actions for development in a specific physical heritage territorial asset, with very specific economic, morphological and organizational characteristics. Similarly, this system adds specific functionality information to each systemic component of the system, by adding individual social economic and technical assessments for each specific action, including those directly related to the sustainability issues.



LEVEL 1. INTELLIGENCE

First methodological phase: defines problem structure, general and specific objectives and strategic actions.

First Technical Assessment. Definition and structuring of the decisional problem (desirable scenario) from a comprehensive territorial, socioeconomic and institutional analysis. This methodological phase organizes the decisional problem structure in four typological substructures that define specific guidelines for development within the decisional problem. This phase was developed by managers in collaboration with stakeholders.



LIVELLO 2. DESIGN

Second Methodological Phase. defines functional MCDA/MCDM architecture by integrating specific systemic components and assigned interest values defined by stakeholder analysis.

Second Technical Assessment. Defines the MCDA/MCDM framework of development for the decisional problem, through stakeholder analysis and functional structuring which assigns specific actions and interest values to strategic assets. This phase was developed by managers in collaboration with stakeholders.

OBJECTIVE

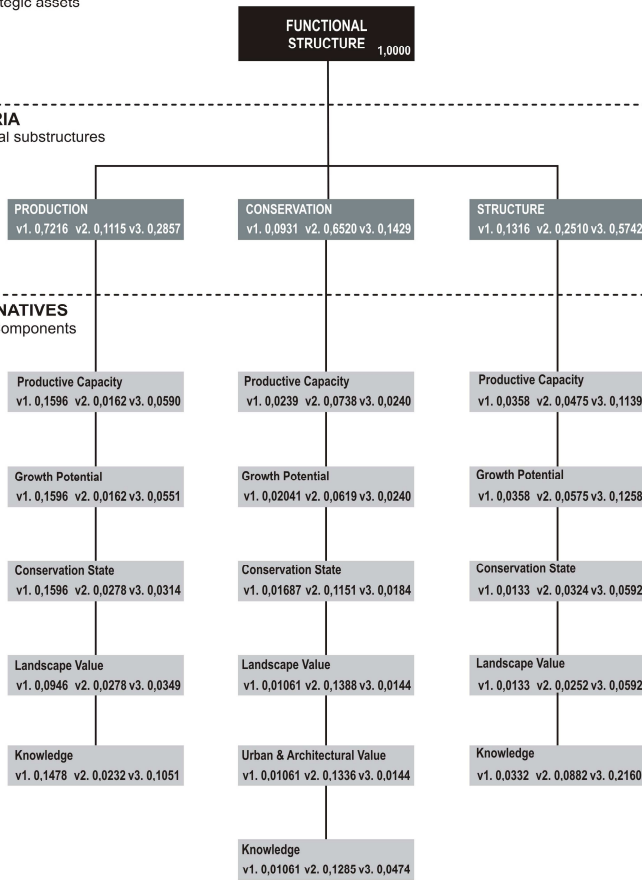
Definition of functional operational structure for a strategic assets

CRITERIA

Functional substructures

ALTERNATIVES

Spatial Components



STAKEHOLDERS

TECNICI E AMMINISTRATORI

LEGEND.

Shared interest groups

V1 Producers/Consumers. Winemakers, Retailers, Residents, Consumers
V2 Owners. Landowners, Associations, Catholic Church, Town Orchestra
V3. Operators. Tourism industry

LEVEL 3. CHOICE

Third Methodological Phase. defines stakeholder interest value levels for every functional Substructure in the decisional problem and ponders new functional attributes assigned to specific assets

Third Technical Assessment. Defines Stakeholder interest value for every functional substructure and assigned strategic assets including cultural and natural heritage on the decisional system. Also, this evaluation assesses the potential institutional scenarios derive from the redefinition of the economic and structural organization of the overall urban system. This phase was developed by managers in collaboration with stakeholders.

FSD

INSTITUTIONAL EVALUATION

ATTRIBUTES

FSD Criteria				$\sum_{i=1}^n W_i / \sum_{i=1}^n W_i$	SH
Prod	0.7627	0.7415	0.7942	0.5881	0.7216
Con	0.0834	0.0816	0.0816	0.1258	0.0931
Stru	0.1539	0.1429	0.1542	0.2857	0.1316
FSD PRODUCTION SUBCRITERIA				NAV	PRODUCTION INDICATORS
$\begin{bmatrix} 1 & 1 & 1 & 2 & 1 \\ 1 & 1 & 1 & 2 & 1 \\ 1 & 1 & 1 & 2 & 1 \\ 1/2 & 1/2 & 1/2 & 1 & 1 \\ 1 & 1 & 1 & 1 & 1 \end{bmatrix}$				$\begin{bmatrix} 0.2213 \\ 0.2213 \\ 0.2213 \\ 0.1311 \\ 0.2049 \end{bmatrix}$	Aggregated judgments: V, C, R, Co Institutional Weight: 0.5623 Institutional relations: Production/consumption (Market relations), labor/capital, ownership Productive capacity: 16.99 ha (28.46 ha max), 75 producers, 132 Value Added per km ² , 46 Agribusinesses, 160 workers Growth potential: 60 % Conservation state: medium Landscape Values: high Knowledge and information flows: very high Consistency coefficient: 1.4% with $\lambda \rightarrow 1$
FSD CONSERVATION SUBCRITERIA				NAV	CONSERVATION INDICATORS
$\begin{bmatrix} 1 & 1 & 1 & 3 & 3 & 3 \\ 1 & 1 & 1 & 2 & 2 & 2 \\ 1 & 1 & 1 & 1 & 1 & 1 \\ 1/3 & 1/2 & 1 & 1 & 1 & 1 \\ 1/3 & 1/2 & 1 & 1 & 1 & 1 \\ 1/3 & 1/2 & 1 & 1 & 1 & 1 \end{bmatrix}$				$\begin{bmatrix} 0.2573 \\ 0.2193 \\ 0.1813 \\ 0.1140 \\ 0.1140 \\ 0.1140 \end{bmatrix}$	Production related assets: 1500 Vineyard pergolas Growth potential: 60% Conservation state: medium Landscape values: high Knowledge and information flows: high Consistency coefficient: 2.9% with $\lambda \rightarrow 1$
FSD STRUCTURE SUBCRITERIA				NAV	STRUCTURE INDICATORS
$\begin{bmatrix} 1 & 1 & 3 & 3 & 1 \\ 1 & 1 & 3 & 3 & 1 \\ 1/3 & 1/2 & 1 & 1 & 1/2 \\ 1/3 & 1/2 & 1 & 1 & 1/2 \\ 1 & 1 & 2 & 2 & 1 \end{bmatrix}$				$\begin{bmatrix} 0.2725 \\ 0.2725 \\ 0.1014 \\ 0.1014 \\ 0.2523 \end{bmatrix}$	Productive Capacity: 6 businesses, 10 workers Growth potential: 80% Conservation State: medium Landscape Values: high Knowledge and information flows: high Consistency coefficient: 0.8% with $\lambda \rightarrow 1$

PRODUCTION

CONSERVATION

FSD Criteria				$\sum_{i=1}^n W_i / \sum_{i=1}^n W_i$	SH
Prod	0.1255	0.0836	0.1255	0.1255	0.1115
Con	0.6520	0.6086	0.6520	0.6375	0.6375
Stru	0.2226	0.3078	0.2226	0.2510	0.2510
FSD PRODUCTION SUBCRITERIA				NAV	PRODUCTION INDICATORS
$\begin{bmatrix} 1 & 1 & 1/2 & 1/2 & 1 \\ 1 & 1 & 1/2 & 1/2 & 1 \\ 2 & 2 & 1 & 2 & 1 \\ 2 & 2 & 1 & 2 & 1 \\ 1 & 1 & 1 & 1 & 1 \end{bmatrix}$				$\begin{bmatrix} 0.1458 \\ 0.1458 \\ 0.2500 \\ 0.2500 \\ 0.2083 \end{bmatrix}$	Productive Capacity: 2,400 m ² of underused agricultural land. Growth potential: 60 % Conservation State: medium Landscape Values: high Knowledge and information flows: high Consistency coefficient: 1.9% with $\lambda \rightarrow 1$
FSD CONSERVATION SUBCRITERIA				NAV	CONSERVATION INDICATORS
$\begin{bmatrix} 1 & 1 & 1 & 1/2 & 1/2 & 1/2 \\ 1 & 1 & 1 & 1/4 & 1/3 & 1/2 \\ 1 & 1 & 1 & 1 & 1 & 1 \\ 2 & 4 & 1 & 1 & 1 & 1 \\ 2 & 3 & 1 & 1 & 1 & 1 \\ 2 & 2 & 1 & 1 & 1 & 1 \end{bmatrix}$				$\begin{bmatrix} 0.1133 \\ 0.0950 \\ 0.1766 \\ 0.2130 \\ 0.2050 \\ 0.1971 \end{bmatrix}$	Production related assets: 8 underused heritage buildings, 3,800 m ² of underused natural heritage. Growth potential: 50 % Conservation State: medium Landscape Values: high Knowledge and information flows: high Consistency coefficient: 3.3% with $\lambda \rightarrow 1$
FSD STRUCTURE SUBCRITERIA				NAV	STRUCTURE INDICATORS
$\begin{bmatrix} 1 & 1/2 & 2 & 4 & 1/2 \\ 2 & 1 & 2 & 2 & 1/2 \\ 1/3 & 1/3 & 1 & 2 & 1/3 \\ 1/2 & 1/2 & 1 & 1 & 1/3 \\ 2 & 2 & 2 & 3 & 1 \end{bmatrix}$				$\begin{bmatrix} 0.1893 \\ 0.2294 \\ 0.1293 \\ 0.1004 \\ 0.3519 \end{bmatrix}$	Productive Capacity: 6 Businesses/10 workers Growth potential: 70 % Conservation State: medium Landscape Values: high Knowledge and information flows: high Consistency coefficient: 5.7% with $\lambda \rightarrow 1$

STRUCTURE

FSD Criteria				$\sum_{i=1}^n W_i / \sum_{i=1}^n W_i$	SH
Prod	0.2857	0.1429	0.1429	0.5742	0.2857
Con	0.1429	0.1429	0.1429	0.1429	0.1429
Stru	0.5742	0.5742	0.5742	0.5742	0.5742
FSD PRODUCTION SUBCRITERIA				NAV	PRODUCTION INDICATORS
$\begin{bmatrix} 1 & 1 & 3 & 2 & 1/2 \\ 1 & 1 & 3 & 2 & 1/2 \\ 1/3 & 1/3 & 1 & 2 & 1/3 \\ 1/2 & 1/2 & 1 & 1 & 1/3 \\ 2 & 2 & 3 & 3 & 1 \end{bmatrix}$				$\begin{bmatrix} 0.2066 \\ 0.1930 \\ 0.1100 \\ 0.1224 \\ 0.3681 \end{bmatrix}$	Productive Capacity: 0.2 Added value per km ² , 6 Businesses, 10 workers, 2,400 m ² of underused agricultural land. Growth potential: 60 % Conservation State: medium Landscape Values: high Knowledge and information flows: high Consistency coefficient: 5.9% with $\lambda \rightarrow 1$
FSD CONSERVATION SUBCRITERIA				NAV	CONSERVATION INDICATORS
$\begin{bmatrix} 1 & 1 & 1 & 2 & 2 & 1/2 \\ 1 & 1 & 1 & 2 & 2 & 1/2 \\ 1 & 1 & 1 & 1 & 1 & 1/3 \\ 1/2 & 1/2 & 1 & 1 & 1 & 1/3 \\ 1/2 & 1/2 & 1 & 1 & 1 & 1/3 \\ 2 & 2 & 3 & 3 & 3 & 1 \end{bmatrix}$				$\begin{bmatrix} 0.1680 \\ 0.1680 \\ 0.1293 \\ 0.1013 \\ 0.1013 \\ 0.3320 \end{bmatrix}$	Production related assets: 3,800 m ² of underused natural heritage Growth potential: 70 % Conservation State: medium Landscape Values: high Knowledge and information flows: high Consistency coefficient: 1.2% con $\lambda \rightarrow 1$
FSD STRUCTURE SUBCRITERIA				NAV	STRUCTURE INDICATORS
$\begin{bmatrix} 1 & 1 & 2 & 2 & 1/2 \\ 1 & 1 & 3 & 3 & 1/2 \\ 1/2 & 1/3 & 1 & 1 & 1/3 \\ 1/2 & 1/3 & 1 & 1 & 1/3 \\ 2 & 2 & 3 & 3 & 1 \end{bmatrix}$				$\begin{bmatrix} 0.1984 \\ 0.2191 \\ 0.1031 \\ 0.1031 \\ 0.3762 \end{bmatrix}$	Productive Capacity: 0.2 Added value per km ² , 6 Businesses, 10 workers, 2,400 m ² of underused agricultural land. Growth potential: 60 % Conservation State: high Landscape Values: high Knowledge and information flows: high Consistency coefficient: 1.8% with $\lambda \rightarrow 1$

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