



PI and MSW service quality evaluation: experiences, needs and perspectives ... and ongoing activities

A. Ancarani, A. Santamaria, F.G.A. Vagliasindi



Department of Civil and Environmental
Engineering, University of Catania, Italy



Pi 08 International Conference
Valencia, Spain - March 12th - 14th



Municipal Solid Waste is

- In Europe the rate of MSW production increased steadily (1%/yr):
 - critical and central issue in environmental policy
- “integrated solid waste management” has always represented a sustainable approach (only technical);
 - Peculiar characteristics (surface treatment, customer duties, siting of plants)
- **recurrent emergencies;**





Municipal Solid Waste issues

- need of taking into account all the significant dimensions of the MSW management (**Novel approach ???**);
- complexity of MSW management
- required participation of the citizens
- significant role of **PIs**.





PIs use in MSW service: experiences



Cost Action C18, 2004-2008



APAT, 2003, 2004



DICA, 2004-today



PIs use in MSW service: needs

- ❑ developed indicators often do **not** really constitute a **coherent set** of PIs and there is no benchmarking between the different local authorities;
- ❑ several indicators are valuable to analyze the performance at **national and regional level**, other directly refer to the **performance of the local companies** entrusted with solid waste services provision;
- ❑ **defining, monitoring, and calculating PIs is not sufficient** for implementing an effective performance evaluation system;



PIs use in MSW service: perspectives

- further efforts are necessary in order to develop:
 - a **standard set of PIs** able to support policy makers at different level (national, regional, local);
 - an **assessment methodology** able to measure the quality level attained and the impact on the socio-economic systems is necessary;
 - **appropriate strategies and policies**, supported by adequate tools, for performance assessment of MSW management systems.



PIs use in MSW service: ongoing activities

- Developing a **Decision Support System** to support effective and sustainable policies in MSW sector.
 - **Holistic Approach** incorporating all the potentially relevant “MSW Management Factors”
(Legal/Political/Social, Environmental, Technical, ...);
 - **PIs** were used to analyse performance measures in MSW service management within a novel assessment methodology;

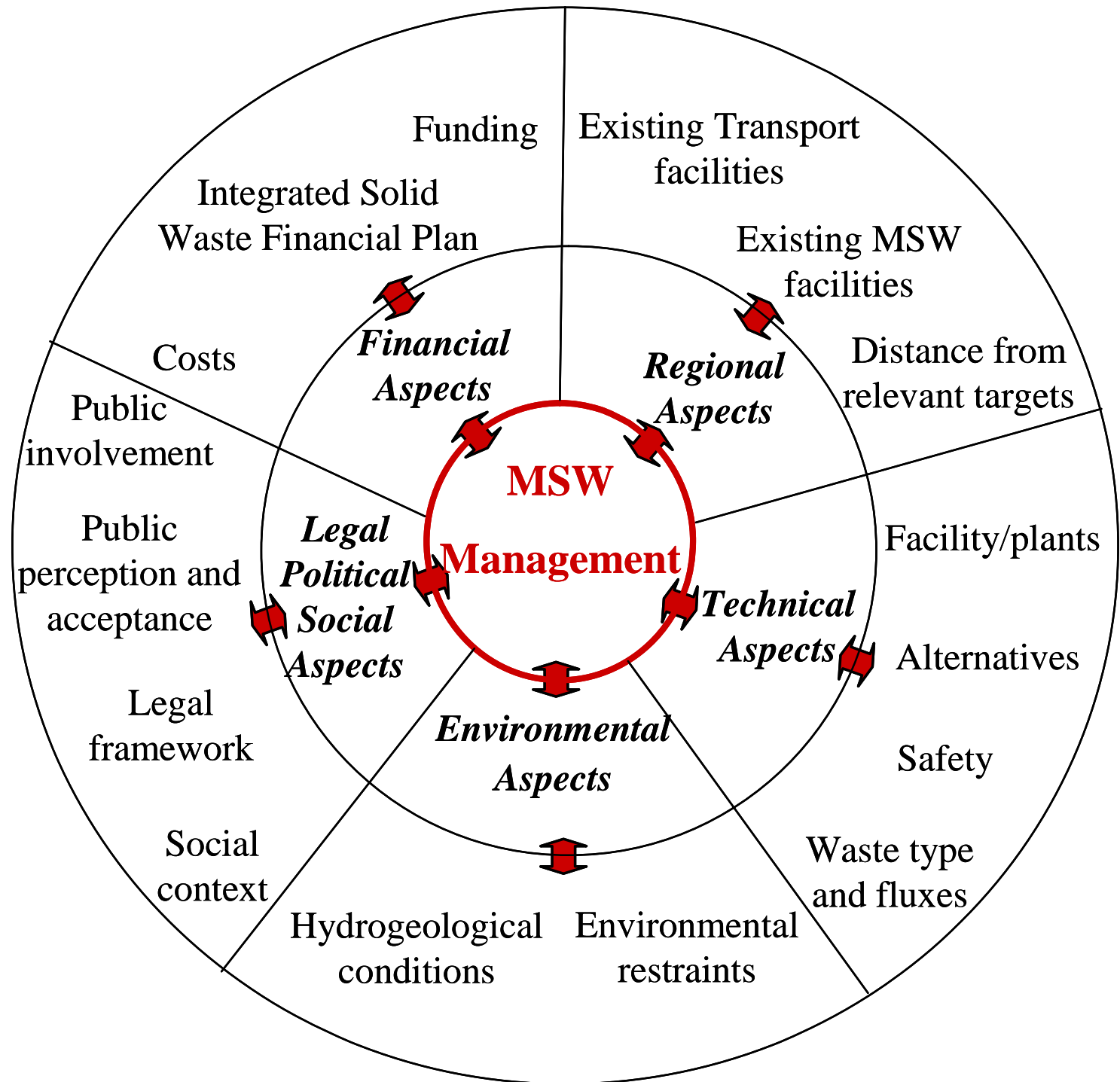


MSW management

from integrated
to
holistic

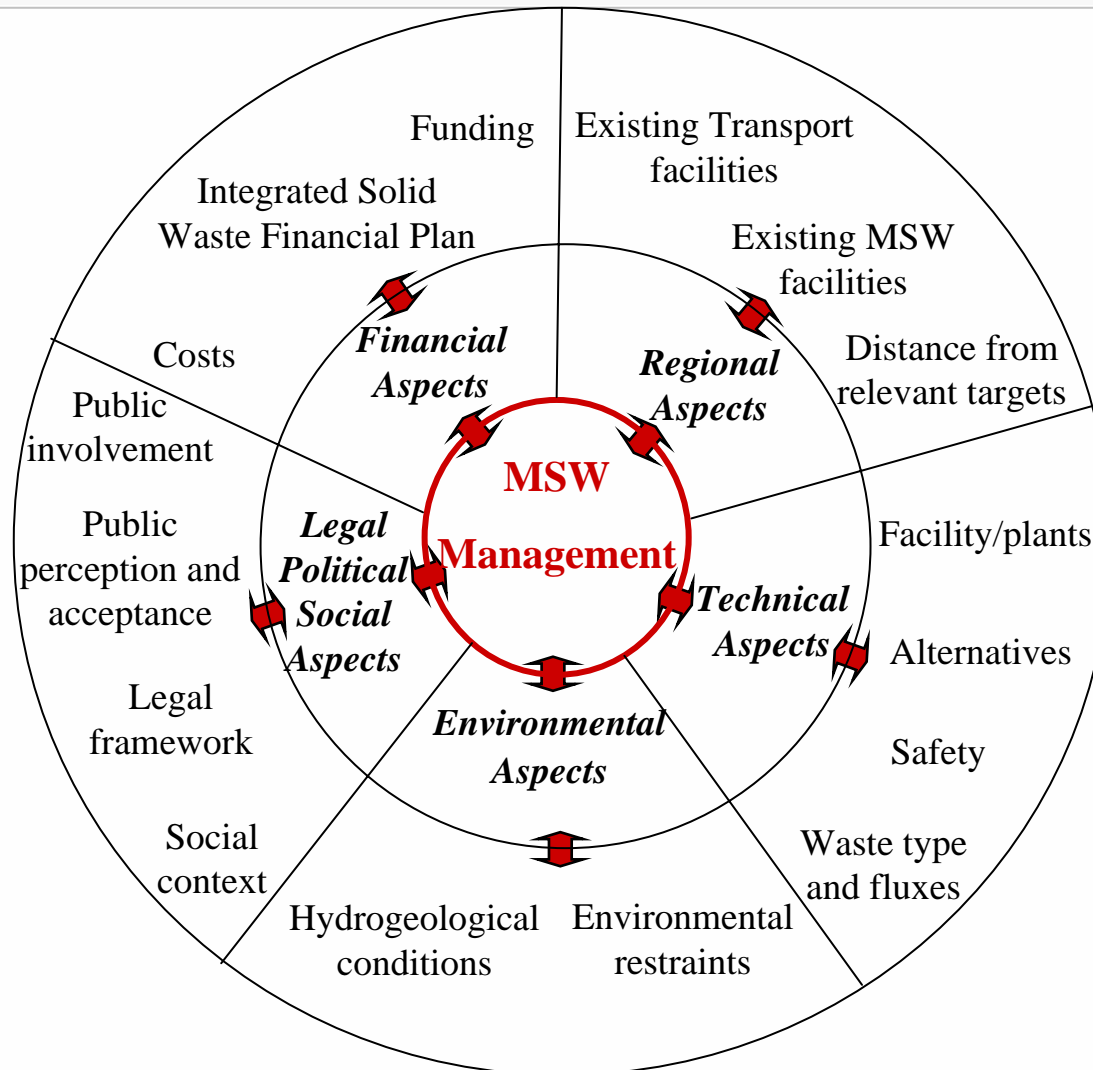


MSW m





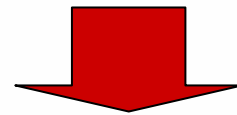
MSW management: from integrated to **holistic**





PIs use in MSW service: ongoing activities

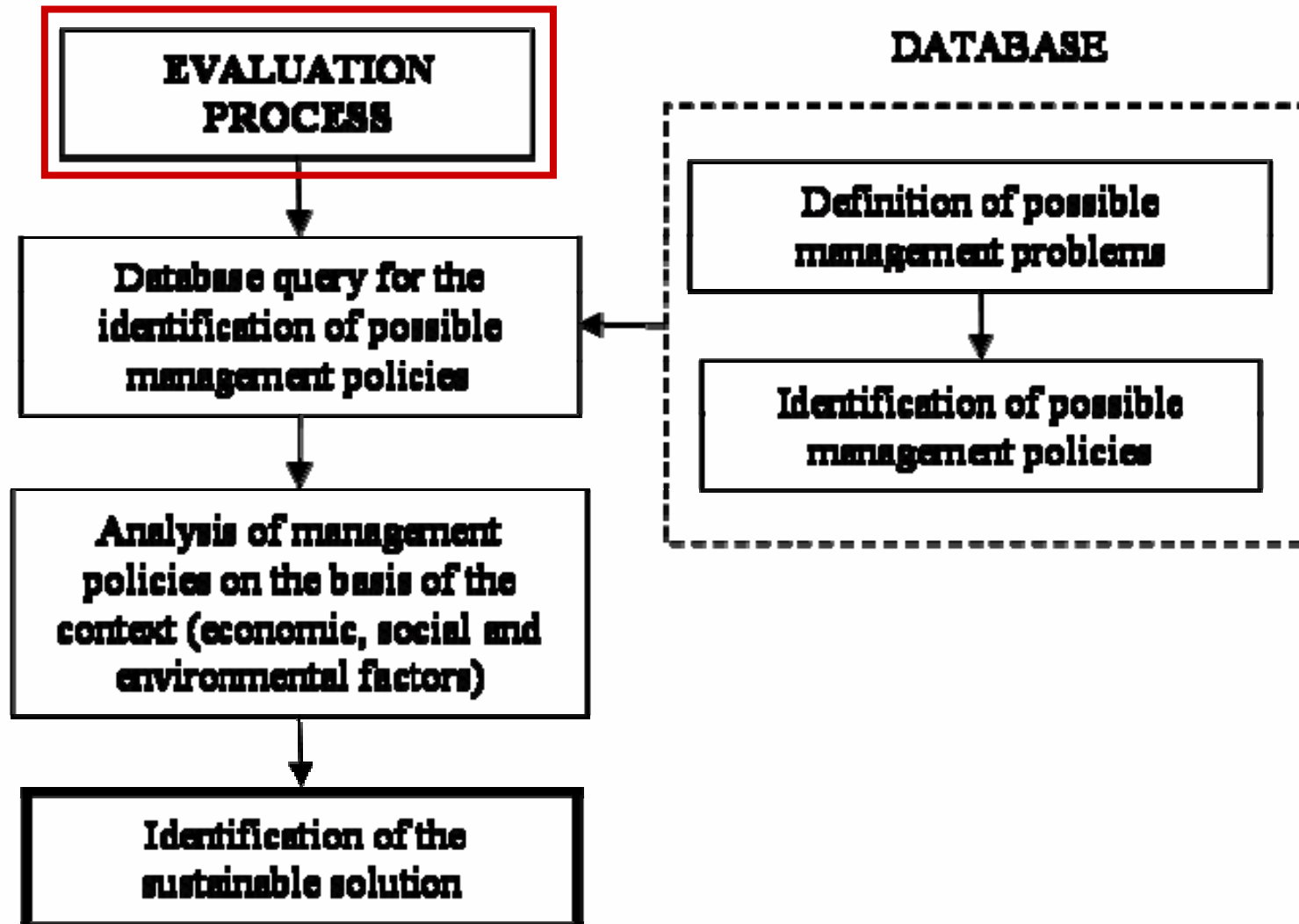
- **Methodology** for improving the use of PIs in conjunction with appropriate methods and models for performance assessment able to support effective and sustainable policies in MSW sector.



Decision Tool for sustainable MSW management solutions

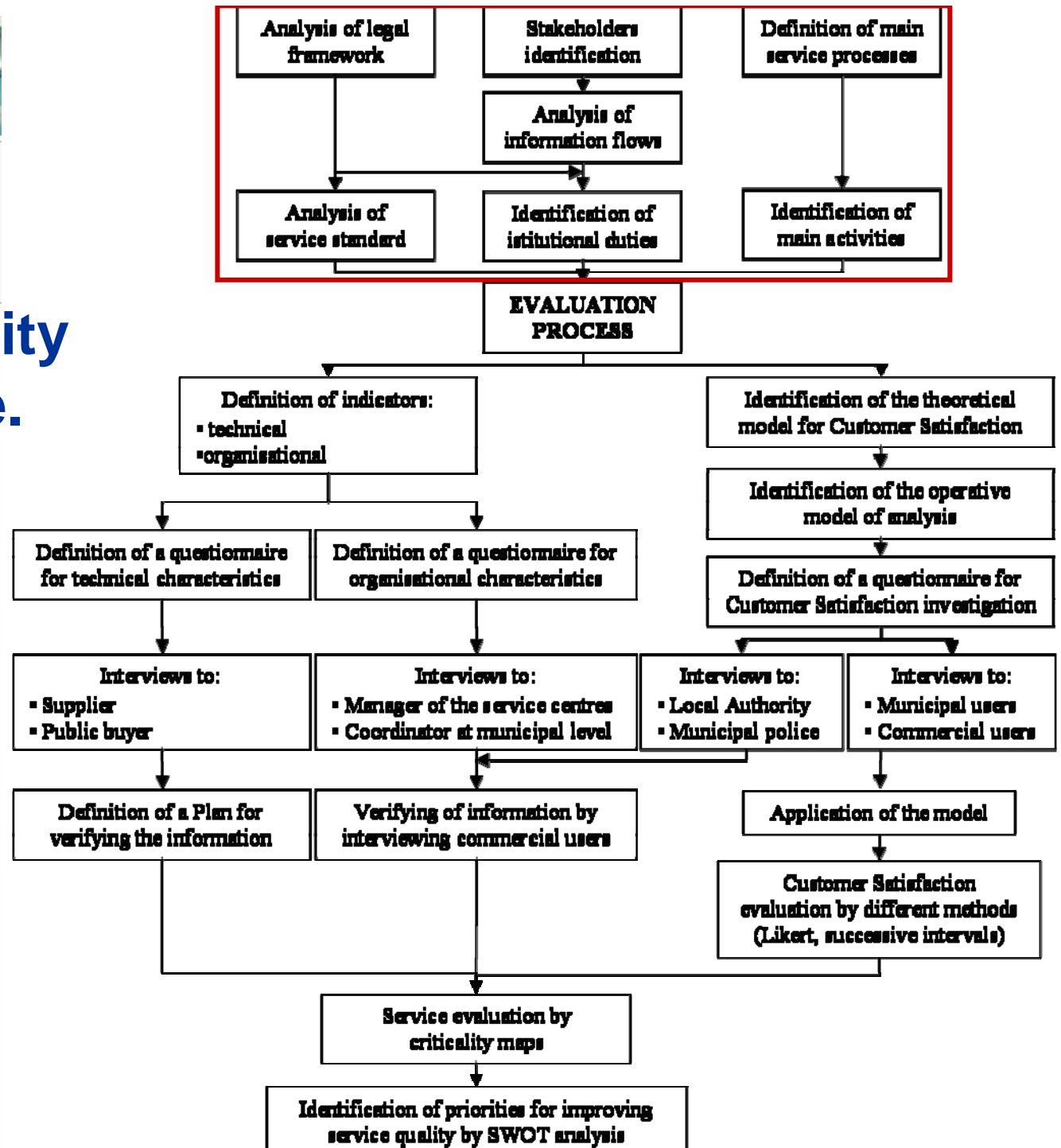


The Decision Tool for sustainable MSW management solutions



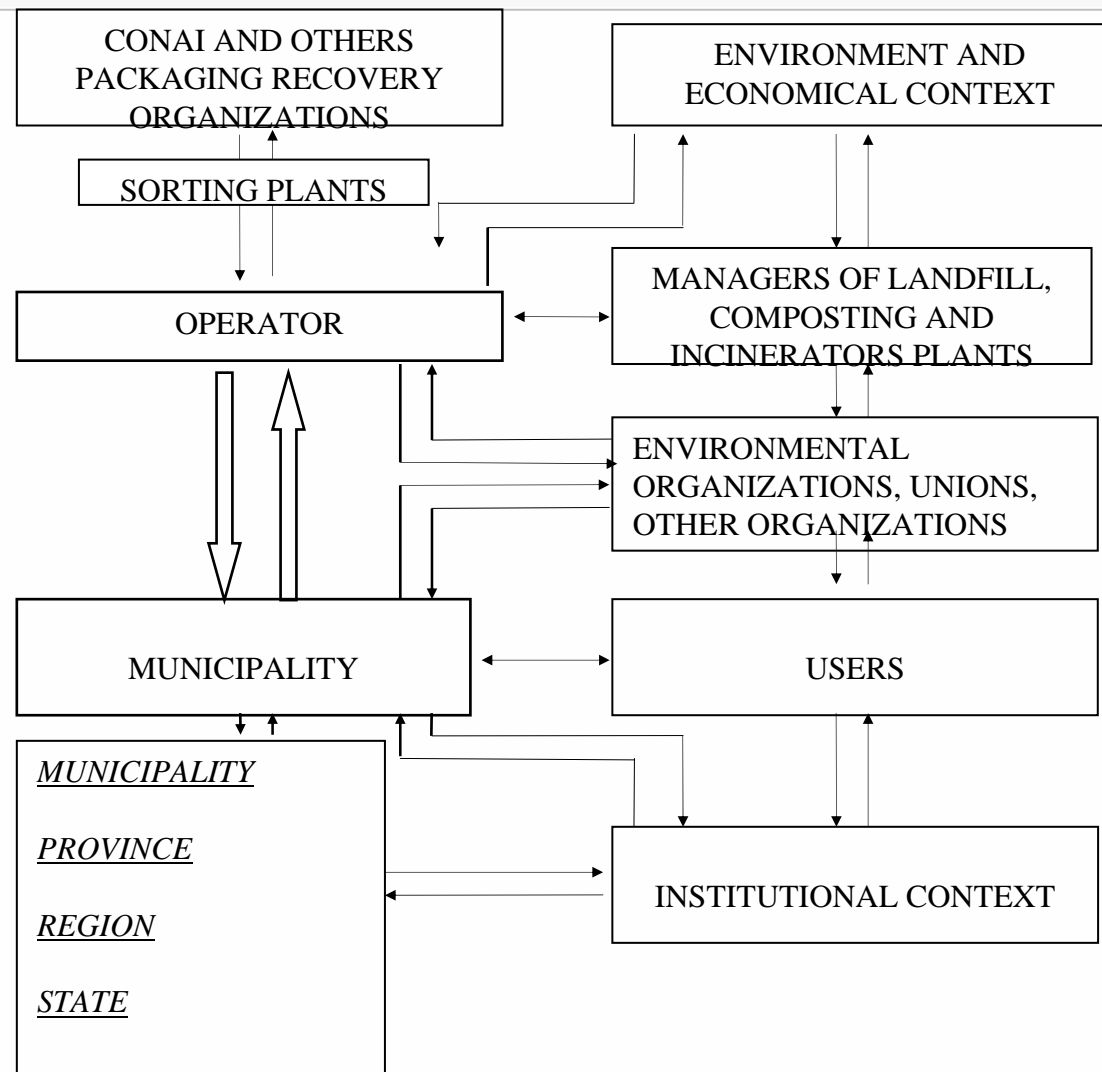


Methodological framework for evaluating quality of MSW service.



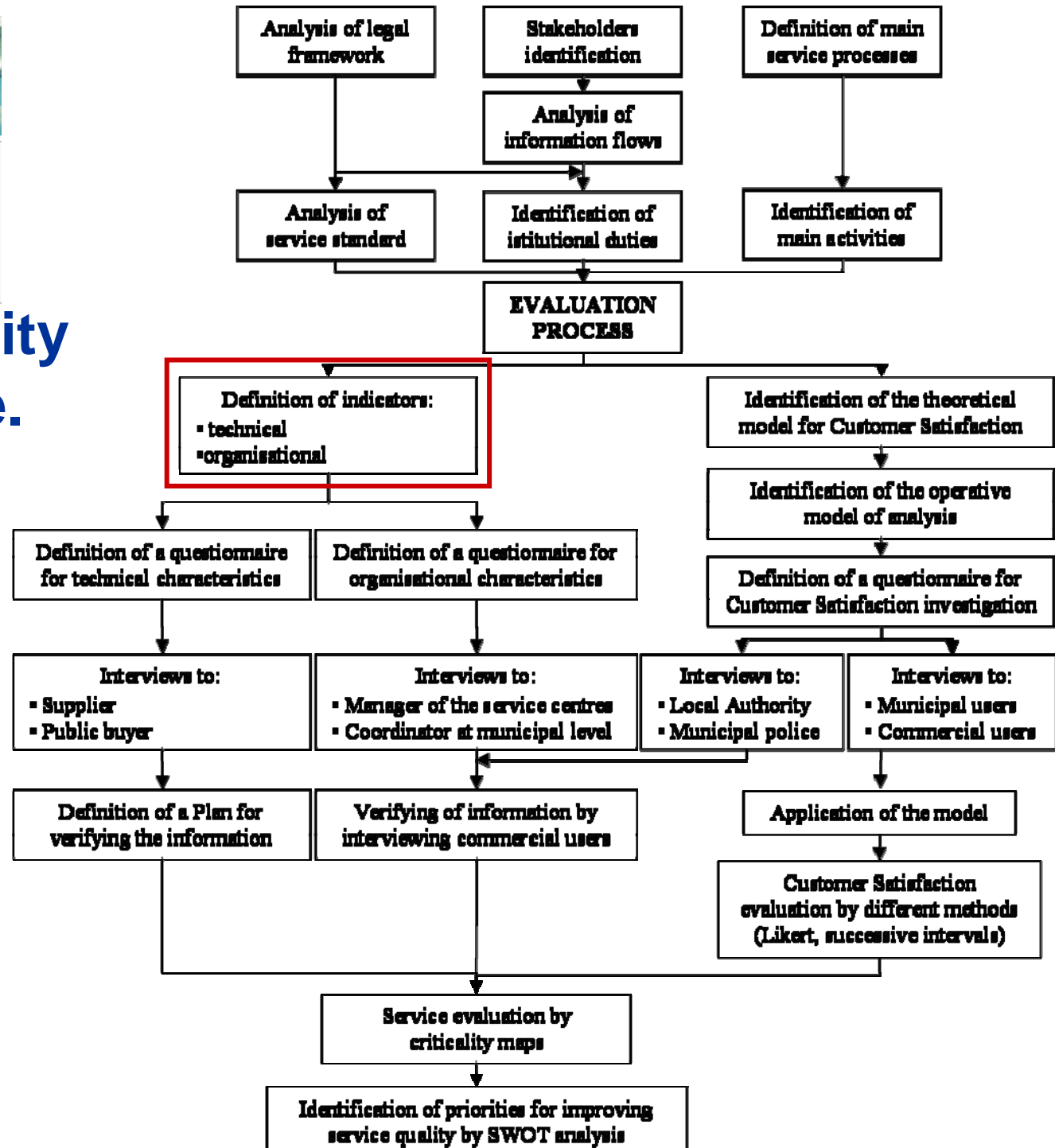


Stakeholders identification





Methodological framework for evaluating quality of MSW service.





Definition of a set of PIs

84 PI

Technical-structural indicators

- Municipal Solid Waste production (6)
- differentiated waste collection (7)
- plants (5)
- vehicles (6)
- level of service (11)
- personnel (5)

Organisational indicators

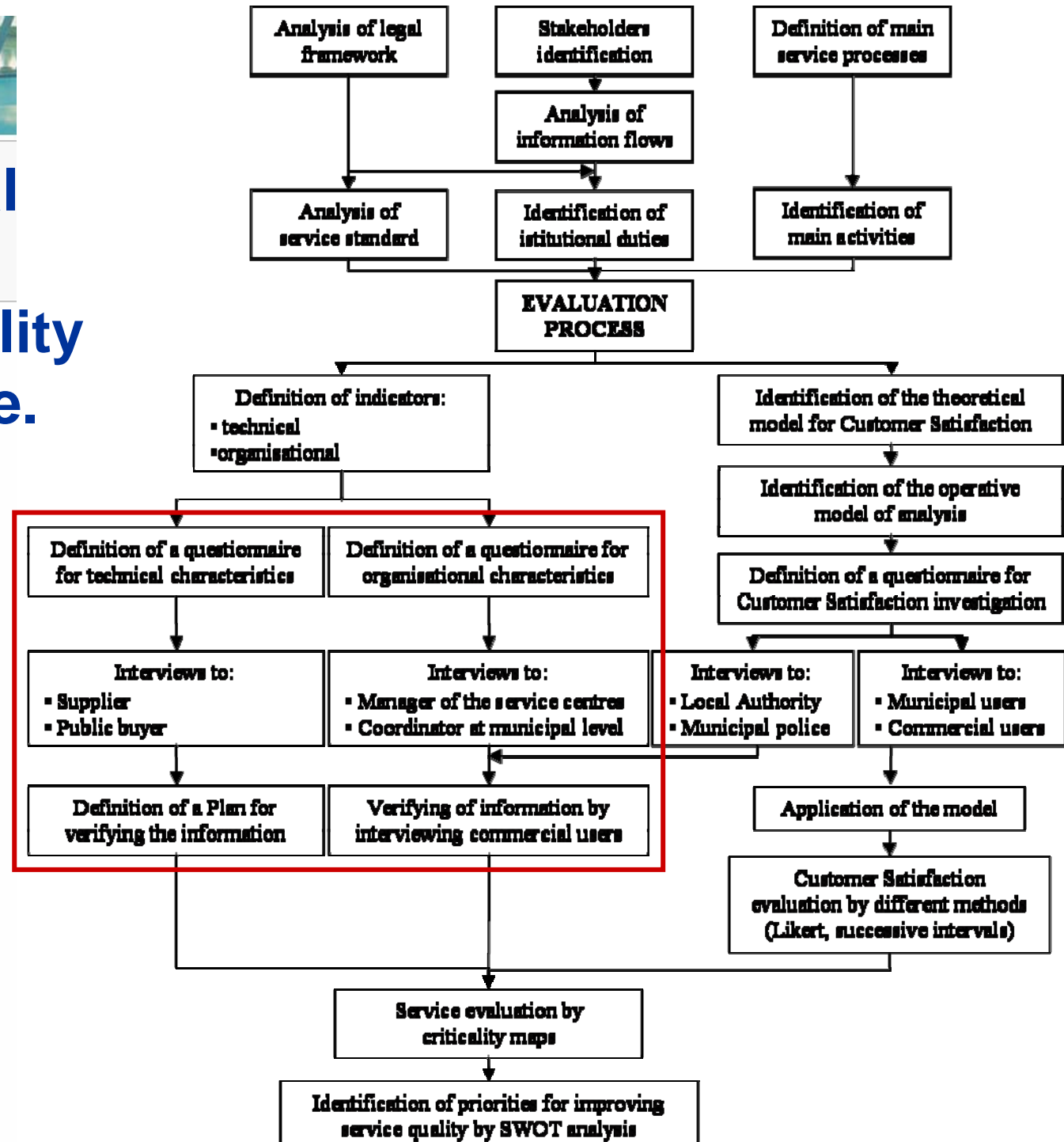
- service frequency (13)
- collection and sweeping complementary service (8)
- reliability (1)

Customer satisfaction indicators

- quality service (7)
- customer relationship (15)



Methodological framework for evaluating quality of MSW service.





Collection and verification of information

Gather technical and organisational information in order to:

- verify the number and the state of MSW facilities/plants;
- identify homogeneous flow of materials;
- verify quality standard required in the formal agreement.

Specific questionnaires related to:

- quantity of undifferentiated waste collection;
- quantity of differentiated waste collection for typology,
- number of MSW facilities/plants;
- frequency and hours of collection and sweeping services.

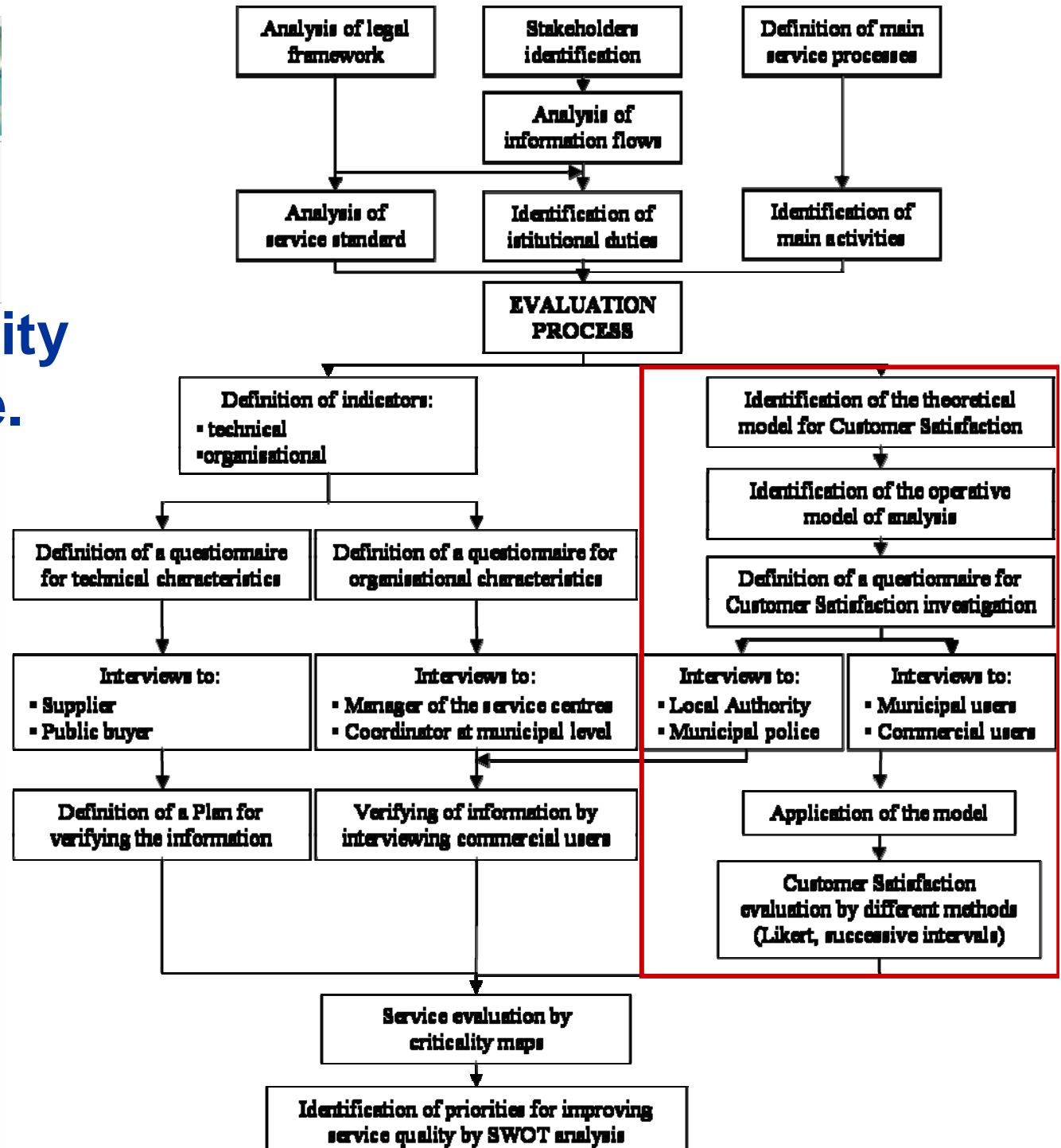


Indicators for the verification of information on the MSW collection

INFORMATION-VERIFIED	INDICATOR	VERIFICATION METHOD
containers	emptying street containers	routing during service operations
	no. containers	counting of containers
	% refilling	investigation in different hours
	state control	investigation on the spot
	presence recycled fraction	investigation in different hours
	presence not allowed fraction	investigation in different hours
street baskets	emptying frequency	routing during the service operations
	no. street baskets in area	counting of street baskets
	state control	investigation on the spot
	% refilling	investigation in different hours
	presence recycled fraction	investigation in different hours
	presence not allowed fraction	investigation in different hours
mechanical sweeping	mechanical sweeping of streets	investigation on the spot before and after the service
manual sweeping	manual sweeping of streets	presence during service
	cleaning of green area	investigation on the spot
street washing	service frequency	presence during service
cleaning and collection in market areas	service frequency	presence during service
	differentiated collection of waste	interviews with a sample group and verification in market areas
	type of waste collected in a differentiated way	interviews to a sample group



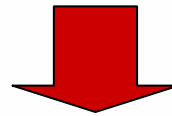
Methodological framework for evaluating quality of MSW service.



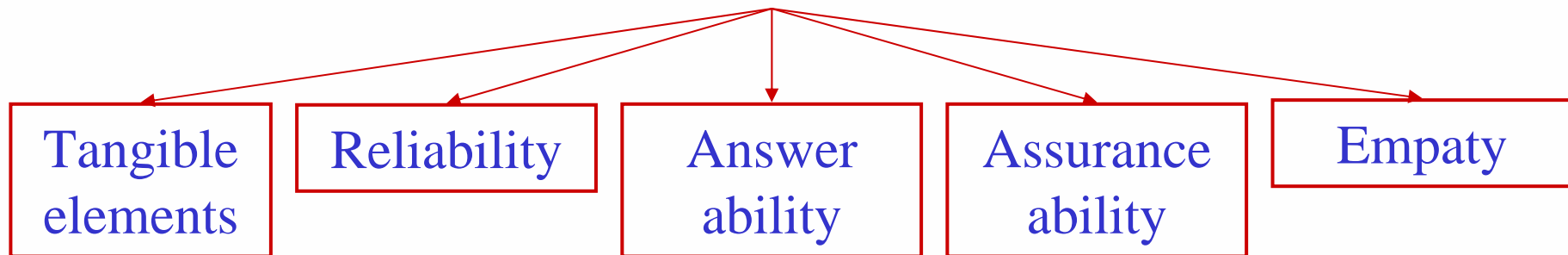


Model for Customer Satisfaction

- Theoretical GAP model
- Operative scheme SERVPERF (with reference to the service quality perceived by customers)



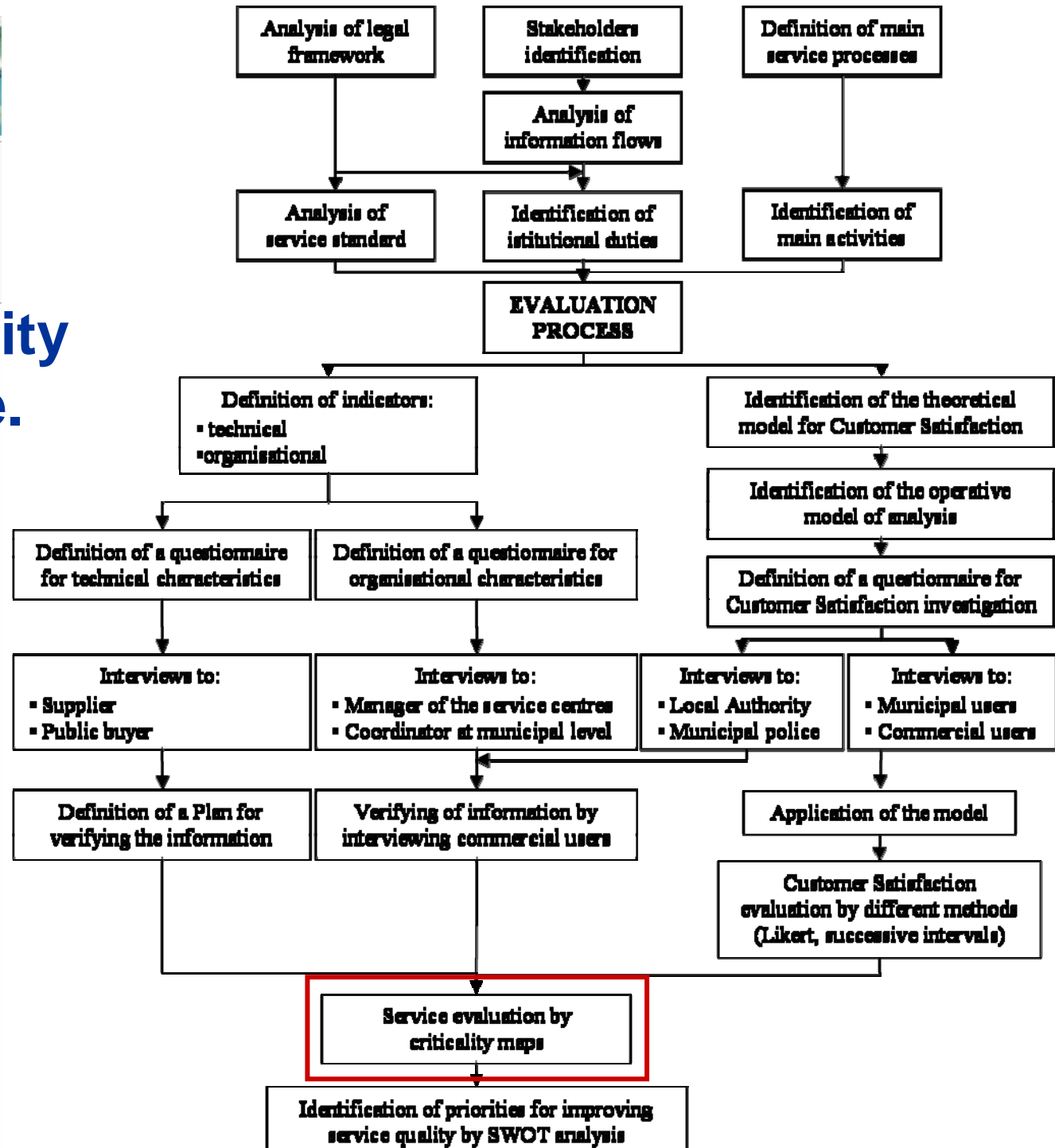
5 DIMENSIONS



- Likert metric (seven points scheme) with the successive intervals method for analysis



Methodological framework for evaluating quality of MSW service.





Evaluation by Criticality Maps

Criticality maps can provide:

- ❑ a comprehensive evaluation showing areas under critical service conditions;
- ❑ useful information to the Authority and to the provider to identify priorities and to implement specific actions to improve non-adequate service conditions.

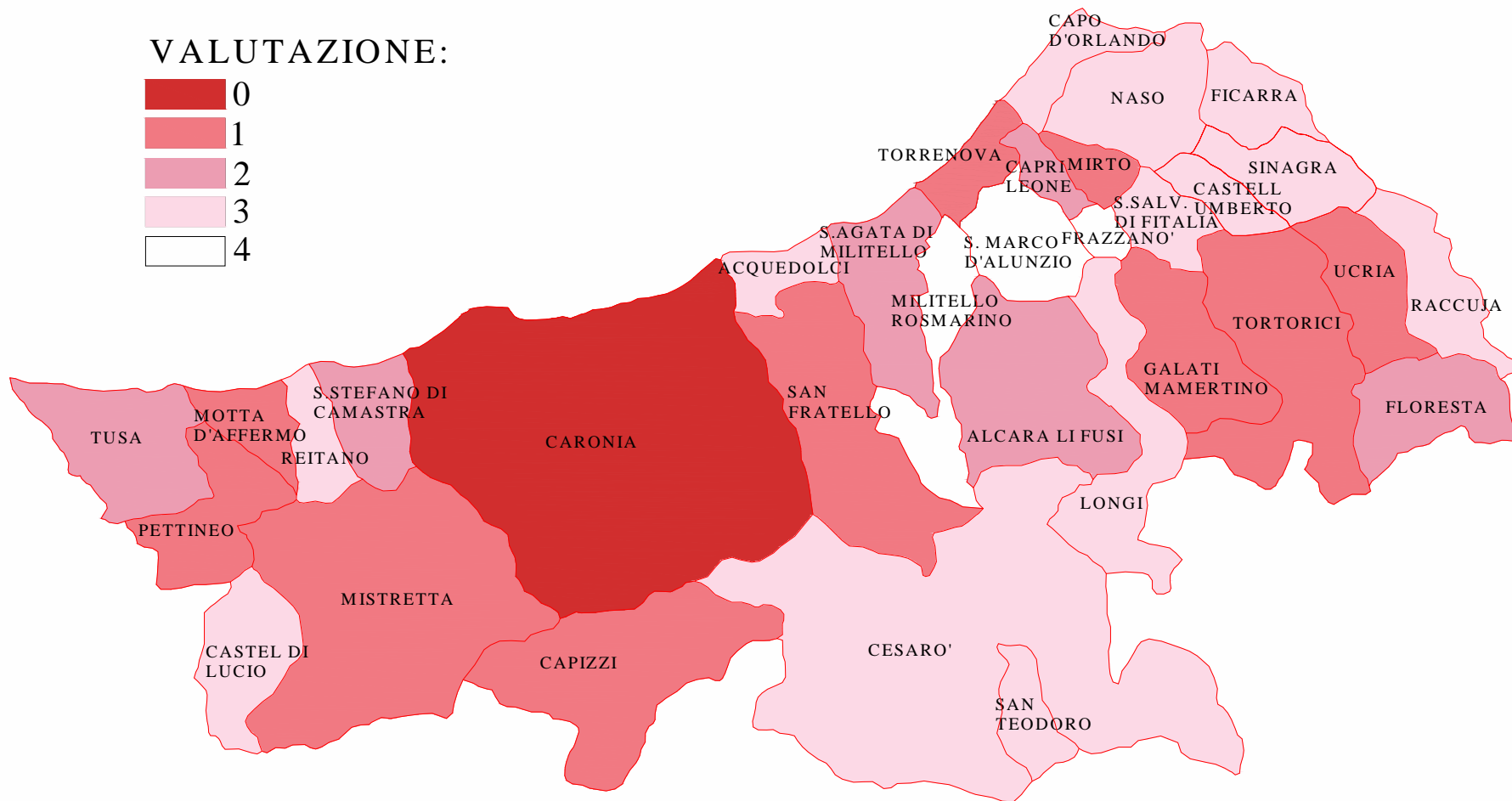
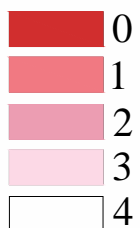
0, no information or insufficient structure;
1, important structural intervention;
2, modest structural intervention;
3, sufficient structural condition;
4, good structural condition.

Different colours on the map



Criticality Map: year 2003

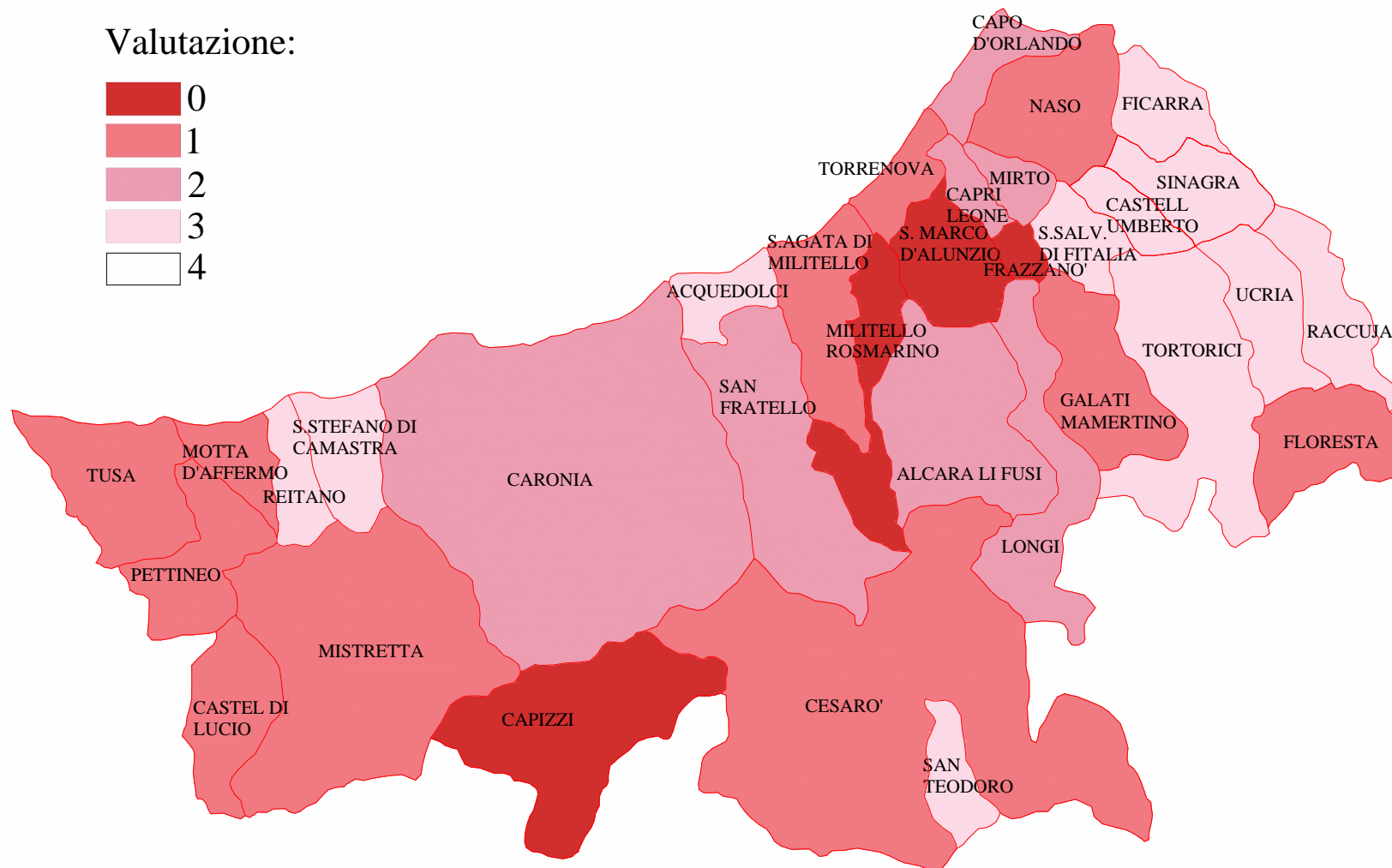
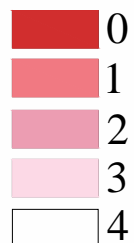
VALUTAZIONE:





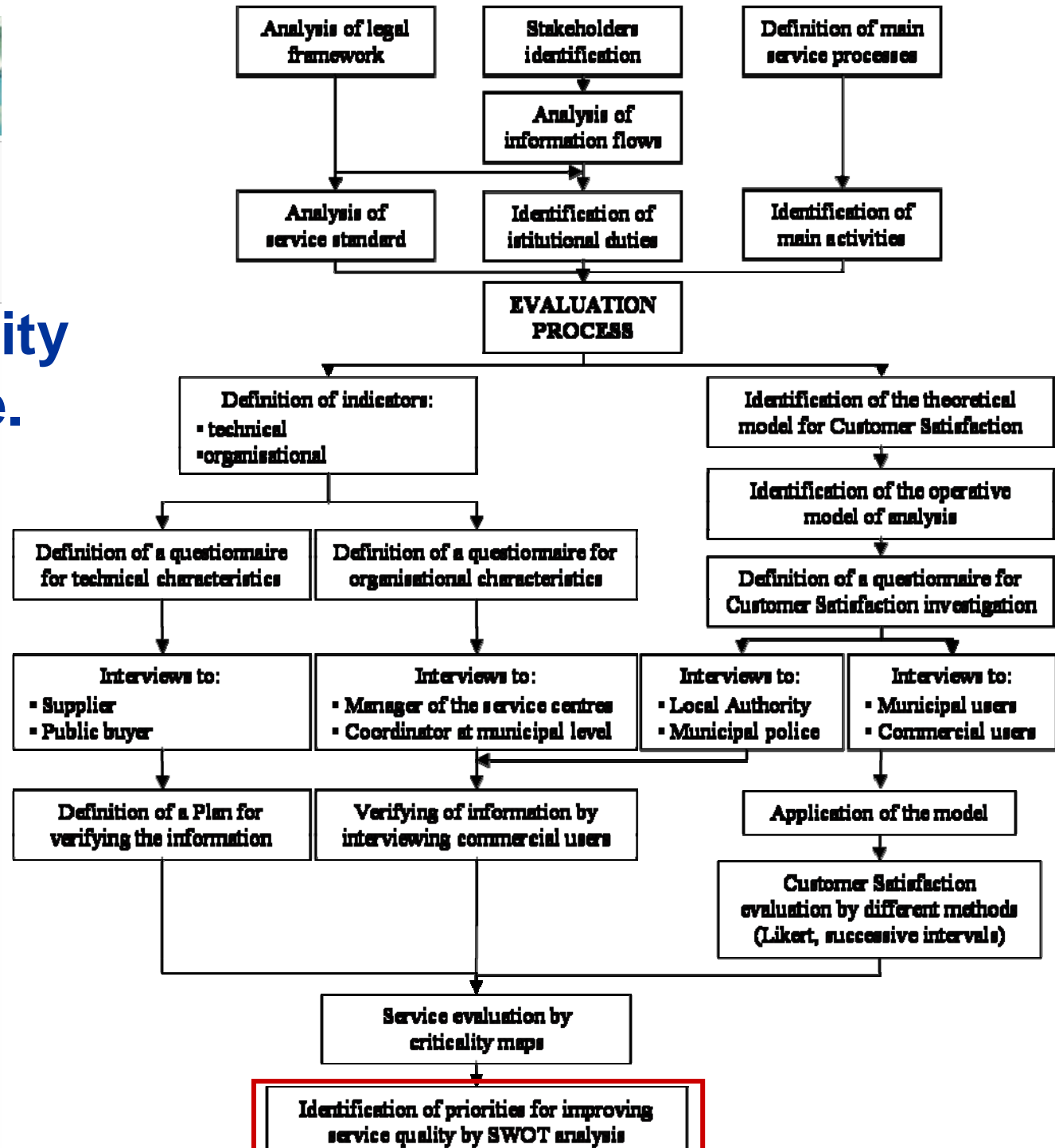
Criticality Map: year 2006

Valutazione:





Methodological framework for evaluating quality of MSW service.





Identification of priorities

SWOT analysis

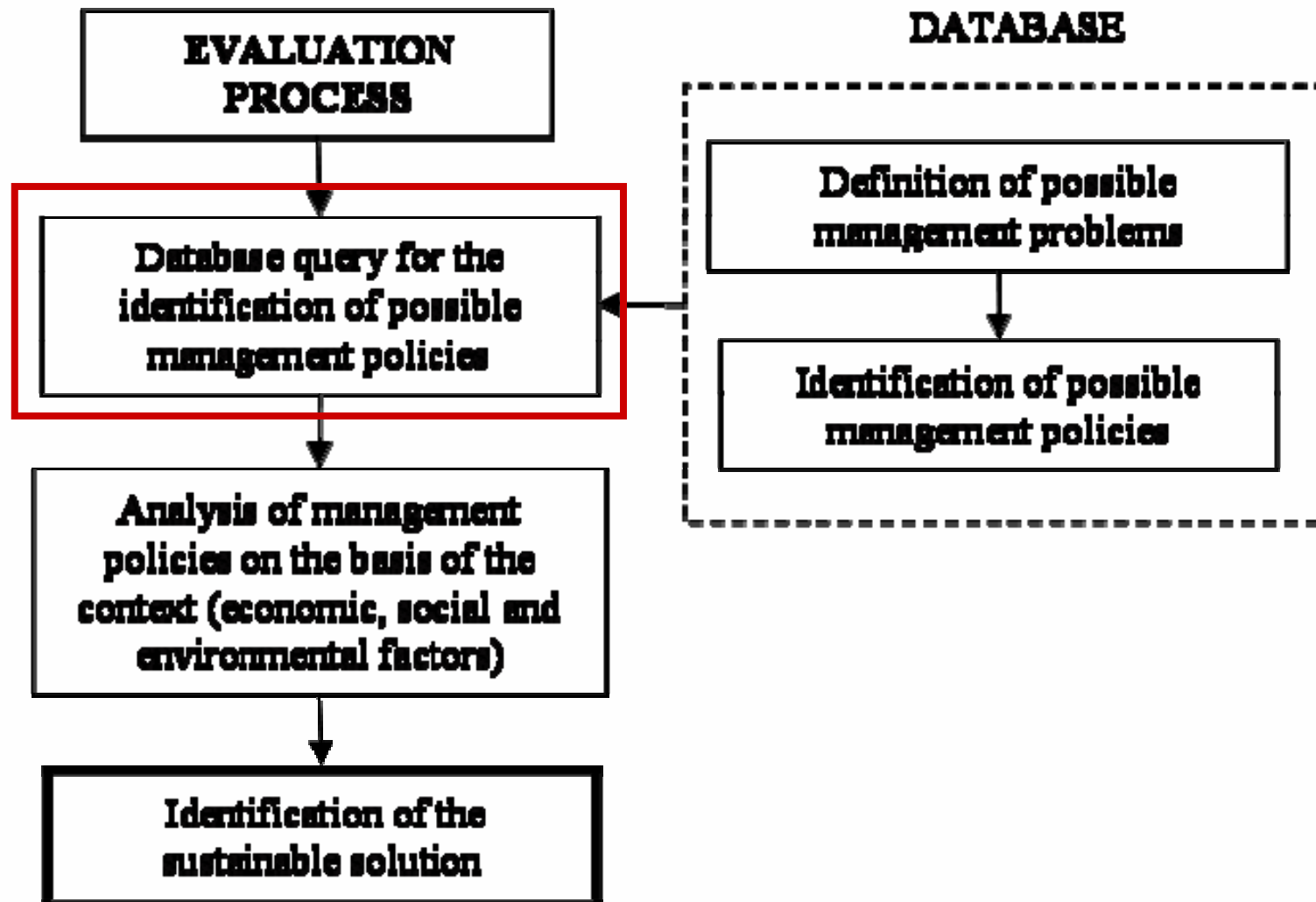
Provides helpful information in the identification of the priorities for improving the service quality

Based on scan of the internal and external environments

Strengths	Weaknesses
Opportunities	Threats



The Decision Tool for sustainable MSW management solutions





The Database

Existing Case studies or
management experiences



Definition of possible
management problems



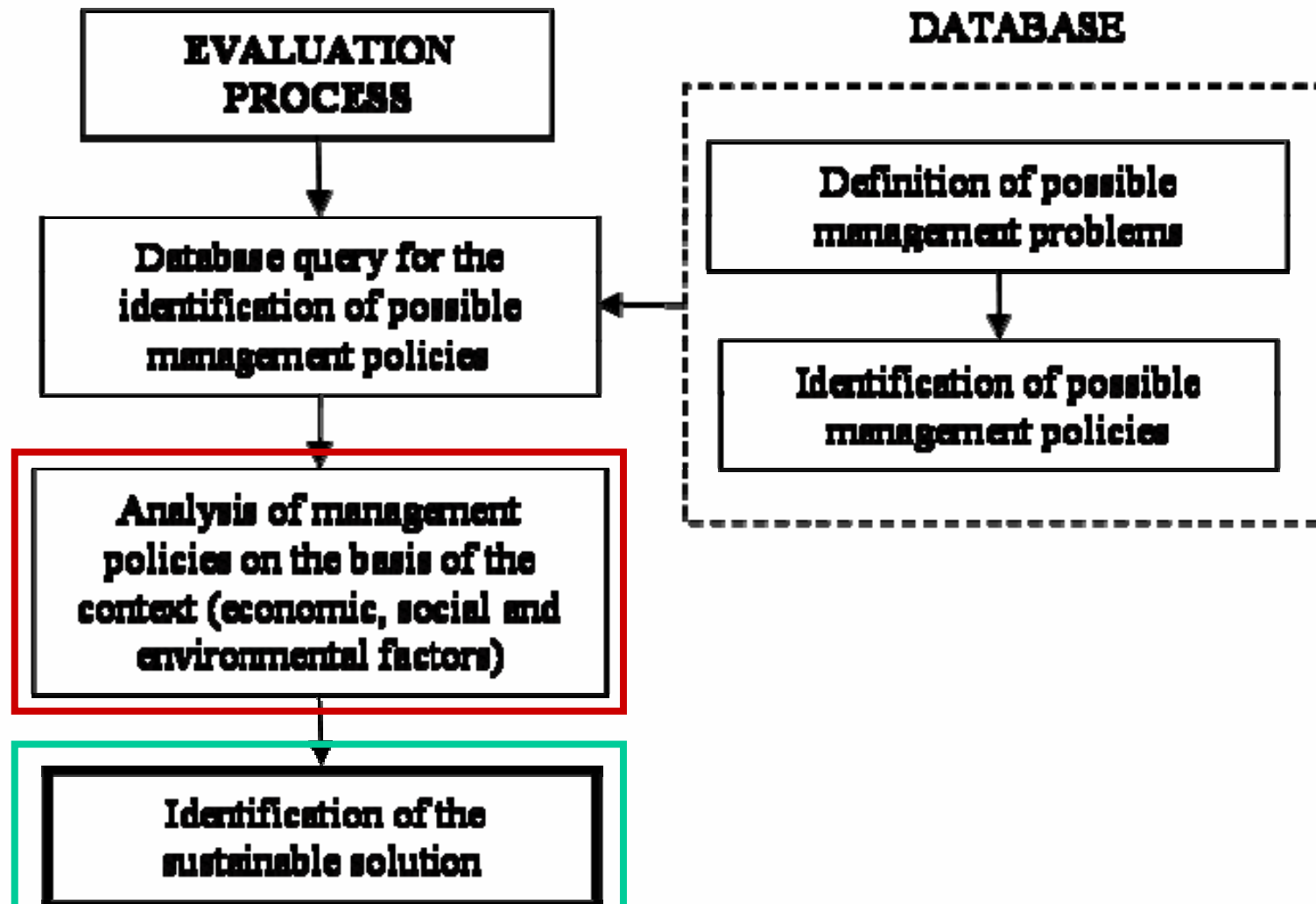
Identification of possible
management solutions

The Database can provide:

- a set of possible management solutions for the identified priorities to attain better quality of the service.



The Decision Tool for sustainable MSW management solutions





Summary and conclusions

- ❑ Sustainable MSW management schemes should be based on a holistic approach;
 - it requires appropriate strategies and policies for performance assessment, supported by adequate tools,
- ❑ The framework of a DSS has been developed aiming at identifying sustainable solutions based on a holistic approach;
 - The DSS includes a methodology for assessing the level of service provided based on PIs



PI and MSW service quality evaluation: experiences, needs and perspectives

A. Ancarani, A. Santamaria, F.G.A. Vagliasindi



Department of Civil and Environmental
Engineering, University of Catania, Italy

Thank you!

aancaran@dica.unict.it
asantama@dica.unict.it
fvaglias@dica.unict.it



CSISA-Onlus
Center for Environmental and Sanitary Engineering Studies
www.csisa.it; info@csisa.it

Pi 08 International Conference
Valencia, Spain - March 12th - 14th