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THE DESIGN OF URBAN QUALITY: INNOVATIVE COMMUNITY FACILITIES IN SUPPORT OF STRATEGIES OF URBAN RENEWAL. A METHODOLOGICAL PROPOSAL.

IL PROGETTO DELLA QUALITÀ URBANA: ATTREZZATURE COLLETTIVE INNOVATIVE IN SUPPORTO DI STRATEGIE DI RIQUALIFICAZIONE URBANA. UNA PROPOSTA METODOLOGICA.

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Cover image: Notes from my research

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to my family

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PREFACE

This thesis is submitted in fulfilment of the requirements for the Italian PhD degree. The work has been carried out at the Department of Civil Engineering at the University of Salerno and took place in the period between January 2014 and December 2016, with Associate Professor Roberto Gerundo as the main tutor, and Associate Professor Isidoro Fasolino as co-tutor.

Most of the work presented in this thesis originated from the following articles published in both national and international peer reviewed scientific journals and refereed conference proceedings:

1. Fasolino, I., Graziuso, G.(2014) Aree interne. Resilienza e opportunità offerte dai luoghi. *Planum. The Journal of Urbanism*, 29 (2): 466-473. Planum Publisher, Rome-Milan. ISBN 9788899237004.
2. Fasolino, I., Graziuso, G. (2014) Proposta metodologica di supporto alle scelte localizzative di servizi urbani. *The 35th Annual Scientific Conference AISRe proceedings, Uscire dalla crisi. Città, Comunità e Specializzazione Intelligenti*, Padova, 11-13 September 2014: 1-18.
3. Fasolino, I., Graziuso, G.(2014) Emergency and public facilities. Verso nuovi standard urbanistici prestazionali. *Urbanistica Informanzioni*, 257: 32-35, Edizioni INU, Rome. ISSN 0392-5005.
4. Fasolino, I., Graziuso, G.(2015) The quality of spaces and public facilities. Remedies for urban insecurity. *The 36th Annual Scientific Conference AISRe proceedings, L'Europa e le sue regioni. Disuguaglianze, capitale umano, politiche per la competitività*, Cosenza, 14-16 September 2015: 1-22.
5. Fasolino, I., Graziuso, G.(2015) Forme dell'abitare come standard prestazionale. *International Conference proceedings, Living Together. 3rd edition of Inhabiting the Future*: 933-941. Clean Edizioni, Napoli.
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7. Gerundo, R., Graziuso, G. (2014) Piano dei Servizi. Proposal for contents and guidelines. *TeMa. Journal of Land Use, Mobility and*

Environment. INPUT 2014, Special Issue, June 2014: 465-476. ISSN 1970-9889.

8. Gerundo, R., Fasolino, I., Grimaldi, M., Graziuso, G. (2015) The performance of urban standards as a way of evaluating the efficiency of services in the municipalities of inland areas. *Pre-prints. The 19th European Colloquium in Theoretical and Quantitative Geography (ECTQG2015)*: 71-72. Plurimondi Press. ISSN 2420-921X.
9. Gerundo, R., Fasolino, I., Grimaldi, M., Graziuso, G. (2015) The performance of urban standards as a way of evaluating the efficiency of services in the municipalities of inland areas. *Plurimondi. An International Forum for Research and Debate on Human Settlements*, 8 (16): 133-141. Plurimondi Press. ISSN 2420-921X.
10. Gerundo, R., Graziuso, G. (2016) Servizi innovativi per una rinnovata qualità urbana. *The 37th Annual Scientific Conference AISRe proceedings, Quali confini? Territori tra identità e integrazione internazionale*, Ancona, 20-22 September 2016: 1-18.
11. Graziuso, G. (2015) Standard urbanistici innovativi. Connessioni prestazionali per la qualità urbana. *Urbanistica Informazioni*, 263 s.i.: 22-24. Edizioni INU, Rome. ISSN 0392-5005.

Moreover, the following pending publication can be added:

- Gerundo, R., Fasolino, I., Graziuso, G. (2016) Verso un'innovativa pianificazione di attrezzature e servizi. Panel in *The 29th INU Congress proceedings, Progetto Paese: il Paese che vorrei*, Cagliari, 20-22 April 2016.

In addition, the co-tutoring at the final assessment (Bachelor's degree in Civil Engineering): Di Stasi, M. L. (2015). *Elementi per una Definizione Prestazionale degli Standard Urbanistici*. Tutor: Professor Isidoro Fasolino and co-tutor Engineer Gabriella Graziuso.

Fisciano, 20 March 2017

ABSTRACT

Currently, urban planning theory and practice is focusing on the renewal and enhancement of the existing urban settlements and no longer on enlargement and expansion of the city. Generally, cities are looking for the sustainable use of resources, paying particular attention to environmental and social aspects. The urban quality and collective well-being cannot be separated from the identification of a network, structuring of the city, of infrastructures and services that are not resolved in the themes provided by legislation. In fact, the characteristics, that transform a place into a liveable area, derive from a set of tangible and intangible urban endowments, that evolve continuously according to their type. Without a balance between the built environment and the consequent urban facilities and services, which are named as *Standard Urbanistici* (Urban Standards) by the Italian legislation, a town can go into crisis.

In Italy, almost fifty years on from the issue of the Decree on the Urban Standards (DI no.1444/1968), currently in force, the problems relating to their planning are unresolved and, moreover, exacerbated: application methods, criteria for the users computing, land acquisition processes, raising funding to move from planning to implementation and management of the infrastructures.

Noting the failure of attempts to define, a priori, a quantity of universally valid services, it is necessary to rethink the strategies and criteria for the provision of infrastructure. In order to meet the real needs of local communities, which are continuously changing, elastic and flexible facilities must be coupled also with a change in the method for their determination and verification. Consequently, a need for the redefinition of tools to interpret the social dynamics and to ensure and assess a changed concept of urban and environmental quality can be revealed, through the identification of innovative equipment and services. "The Urban Standards are and will be those specific services and facilities which the local community, over time, recognizes as basic and essential for the balanced structuring of the territory, and that are standard, i.e. constant, for its management" (Lr Lombardia no.01/2001).

From an initial analysis of the current situation, on the basis of technical references, and from the best practices on services planning, a methodology was developed to evaluate the system of urban standards quantitatively and qualitatively, in order to fully understand what the priorities are and the benefits they can bring.
The intent of the methodology is to define an innovative tool to support land use decisions and to implement the planning of services (*Piano dei Servizi*).
From the application to the planning of services of different techniques, tools and models belonging to different disciplines, the methodology has been defined and integrated into the practice of traditional urban planning, thus becoming also a regeneration tool of the urban system. The methodology has been tested in various municipal systems, producing significant results, reflecting the identity of the places and their morphological, social, cultural and economic features.
The conclusion of the work also tracks possible future developments, which can turn to an operational simplification of the methodology in order to guide the definition of legislation for new services planning.

SOMMARIO

Attualmente, le teorie e le pratiche di pianificazione urbana pongono l'attenzione alla riqualificazione e valorizzazione dell'esistente e non più sull'ampliamento e lo sviluppo delle città. In generale, esse sono rivolte all'uso sostenibile delle risorse, ponendo particolare attenzione agli aspetti sociali e ambientali. La qualità urbana e il benessere collettivo non possono prescindere dall'individuazione di una rete, strutturante per la città, di infrastrutture e servizi che non si risolvono nei temi previsti dalla norma. Infatti, le caratteristiche che rendono un luogo in un buon posto per vivere, derivano da una serie di dotazioni materiali e immateriali, che si evolvono in continuazione per tipologia. In mancanza di un bilanciamento tra l'ambiente costruito e le attrezzature e i sevizi che ne derivano (quelli che vengono definiti "standard urbanistici"), la città va in crisi.

In Italia, a distanza di quasi cinquant'anni dall'emanazione del Decreto sugli Standard Urbanistici (D.I. no.1444/1968), attualmente ancora vigente, i problemi in materia di standard sono, nonché irrisolti, aumentati di numero: modalità applicative, criteri di calcolo dell'utenza, procedura di acquisizione delle aree occorrenti, reperimento delle risorse finanziarie per passare dalla programmazione all'attuazione ed alla gestione delle opere.

Appurati i tentativi di fallimento di definire, a priori, una quantità universalmente valida dei servizi, è necessario ripensare alle modalità e ai criteri da considerare nella definizione della maggior parte delle attrezzature. Con l'intento di incontrare i bisogni reali delle comunità locali, che hanno cambiato il loro aspetto, attrezzature elastiche e flessibili devono essere combinate anche attraverso il cambiamento nel metodo della loro definizione e verifica. Di conseguenza, può essere rilevata la necessità di ridefinire strumenti in grado di interpretare le dinamiche sociali e di assicurare e valutare un diverso concetto di qualità urbana e ambientale, attraverso attrezzature e servizi innovativi. "Gli standard urbanistici sono e saranno quelle attrezzature e quei servizi specifici che a comunità locale, nel tempo, riconosce come basilari ed

essenziali per la strutturazione bilanciata del territorio, e che, sono standard, costanti, per la sua gestione" (Legge regionale lombarda, 2001).
Da una prima analisi dello stato dell'arte, sulla base della consultazione tecnica nazionale ed internazionale, e le esperienze di pianificazione dei servizi, è tato possibile delineare, a partire dalle diverse sue componenti, un percorso di ricerca che mira alla definizione di una metodologia di localizzazione dei servizi, intesi in un'ottica innovativa rispetto a quella tradizionale.
Lo scopo della metodologia è quello di definire uno strumento innovativo di supporto alle decisioni dell'uso del suolo e capace di implementare la pianificazione dei servizi (*Piano dei Servizi*).
Attraverso l'applicazione alla pianificazione dei servizi di diverse tecniche, strumenti e modelli appartenenti a diverse discipline, la metodologia è stata definita e integrata alla prassi di pianificazione urbana tradizionale, diventando quindi anche strumento di rigenerazione del sistema urbano. La metodologia è stata testata in diversi ambiti comunali, producendo dei risultati significativi, che possono rispecchiano l'identità dei luoghi e le loro caratteristiche fisiche, sociali, culturali ed economiche.
La conclusione del lavoro traccia anche possibili sviluppi futuri, che possono rivolgersi a una semplificazione operativa della metodologia per poter orientare la definizione normativa di pianificazione dei servizi.

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ABOUT THE AUTHOR

Gabriella Graziuso. She graduated in Civil Engineering at the University of Salerno in 2012, with a grade of 110/110.
In 2014 she was admitted to the 15th cycle (new series) of the Doctorate Course in Civil, Architectural, Land and Environmental Engineering, path Engineering for Structures, Building and Urban Recovery, at the Department of Civil Engineering of the University of Salerno, undertaking a research project aimed at the definition of innovative urban standards.
Annually, she is being appointed an honorary expert in urban planning (ICAR 20- ICAR 21) and involved in teaching and correlation of the thesis regarding the same field.
She was the winner of a scholarship at the Municipality of Olevano sul Tusciano (Sa) for the editing of the Municipal Urban Planning, where she also carried out training activities.
In 2016, she won a scholarship at the DiCiv entitled: Models for supporting the choices for the forecasting and implementation of innovative and performing community facilities.
Since August of the same year, she has been spending a period of research abroad at Ulster University, where she explored the issues and knowledge of the tools necessary to finish the PhD studies, and where, currently, as a visiting scholar, she is attempting to apply the methodology implemented in her studies in the Northern Ireland context.
Since 2012, she has been a member of the National Planning Institute (INU), and since 2014 she has been a member of the Italian Society of Town Planners (SIU) and Italian Association of Regional Science (AISRe).

Gabriella Graziuso. Si laurea in Ingegneria Civile presso l'Università di Salerno nel 2012, con votazione 110/110.
Nel 2014 è ammessa al XV ciclo (nuova serie) del corso di Dottorato in Ingegneria Civile, Edile-Architettura, Ambientale e del Territorio, percorso Ingegneria delle Strutture, Recupero Edilizio ed Urbano, presso il Dipartimento di Ingegneria Civile dell'Università di Salerno, intraprendendo un percorso di ricerca volto alla definizione di standard urbanistici innovativi.
Annualmente è nominata cultore della materia in pianificazione urbana (ICAR 20- ICAR 21) ed è coinvolta in attività di didattica e correlazione di tesi di laurea.
È risultata vincitrice di Borsa di Studio presso il Comune di Olevano sul Tusciano (Sa) per la redazione del Piano Urbanistico Comunale, dove ha svolto anche attività di tirocinio.
Nel 2016 è vincitrice di Borsa di studio presso il DiCiv dal titolo: Modelli di supporto alle scelte per la previsione e l'implementazione di attrezzature urbane innovative e di qualità.
A partire da agosto dello stesso anno trascorre un periodo di ricerca all'estero presso il l'Ulster University, dove ha approfondito i temi e la conoscenza degli strumenti necessari a concludere la ricerca di dottorato, e dove, attualmente, in qualità di visiting scholar sta tentando di applicare la metodologia definita nel corso dei suoi studi al contesto nord irlandese.
A partire dal 2012 è socia dell'Istituto Nazionale di Urbanistica (INU), e dal 2014 è socia della Società Italiana degli Urbanisti (SIU) e Associazione Italiana di Scienze Regionali (AISRe).

PART I – BACKGROUND AND ANALYSIS FOCUS

1 INTRODUCTION

"…
- Cities also believe they are the work of the mind or of chance, but neither the one nor the other suffices to hold up their walls. You take delight not in a city's seven or seventy wonders, but in the answer it gives to a question of yours.
- Or to the question it asks you, forcing you to answer, ….".

(Calvino, 1972: 42).

The research undertaken and reported in this thesis scrutinises the issues relating to community facilities and services planning, which are generally defined as Urban Standards[1] by the Italian legislation. Given the failure of the traditional urban standards, that were defined quantitatively and valid universally, today, the attention is focusing on the identification of innovative strategies and criteria for the provision of infrastructure.
This chapter is characterized by a general overview of the topic and, through its structure, defines the contribution of the research for

[1] The Urban Standards referred to spatial planning indicate the minimum requirements for building density and public spaces or facilities public interest (Falco, 1987).
Precisely, the term, used both alone (commonly with the plural: standards) and the specific diction of "urban standard", indicates a "minimum indefinable value" of urban or architectural parameters. It is a minimum value, considered as the "mandatory endowment level and the minimum threshold below which the regulatory provision cannot be considered" (IASM, 1983: 34). Salzano (1999: 138) defines the standard as "determining the minimum amounts of public space, expressed in square meters per inhabitant, which must be reserved in the urban (whether general or specific) plans". Similarly, Tutino (1965) believes that the standard is a flag (banner or symbol), which needs to be renewed at each achieved goal in order to maintain its value. In other words, the standard is a rule expressed in a minimum or maximum numeric value which must be a reference for the urban planning instruments (Barocchi, 1984).
From a technical point of view, it can be defined as a precise amount of area (i.e. land area) that is mandatory by law and expressed in square meters per inhabitant to be allocated to public facilities and services and to be provided in the territorial utilization and transformation in order to ensure a balanced urban development.

planning innovative urban standards. Figure 1.1 shows the diagrammatic representation of the introducing chapter of this thesis.

Figure 1.1 Introduction diagram

1.1 TOPICS AND RESEARCH RELEVANCE

Recently, a number of interesting new processes for the construction and renewal of the city have emerged through the launch of several experimental projects, new interventions and programming practices, which are fundamentally changing the mode and the content of the actions on the city and surrounding area. In a complex urban society, characterized by a strong sense of individuality and where differentiated demands and needs are increasingly occurring, the goals that must be pursued are those of a thorough review of the mode of transformation of the city and, generally, of the culture of good living. Consequently, there is a widespread recognition of the need for the redefinition of tools to interpret the social dynamics and, moreover, there is a necessity to ensure and assess a changed concept of urban and environmental quality, which can be revealed through innovative equipment and services.
Currently, the theme of urban standards has returned to the spotlight, as the fiftieth anniversary of their introduction into Italian law approaches,

DI[2] no.1444/68, and because now it is possible to draw a concrete balance of their role in the construction and transformation of Italian cities and territories.
Discussing the urban standards, firstly, leads to the clarification of two important concepts: the first is that of facility, which means a physical and architectural product, a built space, and the second is that of public service for which the facility is designed and built, summarizing, in its identification of necessary assets for collective satisfaction, the qualifying role of the public action. Today, the notion of urban standards seems no longer to be necessarily linked to the physical endowment of areas or building structures, but it can be extended to all those that contribute concretely to achieve a higher quality of life (Gerundo et al., 2013).
Several changes have occurred since the enactment of the Inter-ministerial Decree. The first change of fundamental importance concerns the transformation processes of urban systems: the focus of urban planning is no longer the problem of expansion and development of the city, but that of the renewal and enhancement of the existing urban settlements. Simultaneously to the urban context, society has changed, as well as the demand for services. The change in the way the city is experienced corresponds to a new articulation of the social brackets and a consequent highly detailed framework of the demand for services emerges (Ricci, 1999). New requirements are added to the traditional requirements, attributable in particular to the attention on the environment and social aspects, which are already essential issues and integral part of urban planning. Last but not least, the phenomenon related to the emergence of new practice and trends of proactive-negotiating type upsets the traditional instrumentation, as well as the approach to planning practice. This is set up in an institutional political context that looks at a growing demand for accountability and legitimacy for the autonomy of choices by local authorities.
In this changed context, noting the failure of attempts to define, a priori, a universally valid quantity of services, it is necessary to rethink the ways and criteria for most infrastructural facilities. Academics argue that the quality of facilities can be considered as an alternative, or rather, as a complement, to their quantitative evaluation. This means that there is a transition between the concept of community facilities based on quantity and one based on performance: some aspects, such as location, quality,

[2] Inter-ministerial Decree.

and usability, become important (Colombo et al., 1985). The focus moves essentially from the insurance of a stock of public areas to that of the real planning of spaces actually usable and organically integrated into the urban and territorial context. More generally, the reference is in a changed concept of standard: there is the transition from the abstract allocation of areas to the definition of "conditions which ensure the effective allocation of services and community facilities for the city in terms of construction, maintenance, management and therefore of actual consumption by the citizens" (Odorisio, 1999). In fact, all that is minimal essential for the existence of a settlement and does not represent an implementation in qualitative terms (for example the road system and essential technological networks) cannot be considered a standard. In essence, urban standards can be considered fundamental to the livelihoods of a part of the territory to be served, instead of services. So, it is possible to define the local field of the identity and image of the territory by overcoming the old concept of equipment, too often far from the logic and the evolutionary dynamics of the local reality, and by taking responsibility for the infrastructural quality of the territory through facilities that include new spaces, new functions and new entrants able to be active in the various phases (program, design and management) of urban transformation (ibid.).

In order to meet the real needs of local communities, that have changed in their appearance, many elastic and flexible facilities must also be integrated, along with changes in their determination and verification. There is, indeed, a considerable debate about the significant importance of considering both the specificity of existing contexts, by defining different interventions that follow the same approaches, and the fragmentation of social demand, which depends on the age, income and social class (for instance, new social groups such as the elderly, single people or immigrants are increasing their numbers compared to the past). Also, the practice must be progressively inspired by more sober lifestyles, aimed at recovering and rationalizing the provisions. Moreover, the expansion of the catalogue of facilities and services has to be practiced in various fields, from social assistance to businesses, sustainability, communication, and sharing. In fact, the range of services seems to be diversified and articulated in relation to new types, such as social housing, slow mobility, micro-grids of naturalness, and facilities for emergencies (Cáceres et al., 2003).

The introduction of procedural innovations in urban planning leads to the identification of a number of principles to be taken into account for the definition of innovative standards, which will integrate their quantity and quality. This include, efficiency and effectiveness, usability, accessibility, multi-functionality, flexibility, social and environmental security, mixité (i.e. mixed functions), sustainability, spatial and equal distribution and participation (Gerundo et al., 2013).
According to the previous considerations, it can be defined that there is a transition from the timeless and de-contextualized binding urban standards, to a tool of urban and environmental quality, which facilitates the realization of what is possible, relative to a perfect, but often unfulfilled, urban and territorial framework.

1.2 RESEARCH AIM AND OBJECTIVES

The intent of the research is to investigate the planning of urban standards, meaning both facilities and public services necessary to ensure the quality of residential settlements in the Italian context.
The overarching goal of the research is:

"to define a methodology of planning and locating community facilities and services that might give support to the decision-making processes for the assets of urban planning, in order to improve urban quality and collective well-being".

In order to achieve the main aim, the following research objectives were created to undertake the thesis:

1) to identify analytical issues on urban standards, which contribute to the sustainable development and quality of life, since the project of the assets of services crosses the theme of collective and social needs of the territory, bringing part of the debate inside the practice and urban welfare policies;
2) to review the scientific contributions and technical knowledge of manuals in order to understand the spatial models for the territorial organization of the services and their operative design;

3) to collect national and regional regulations on the government of the territory and the service planning, understanding their actual structural and operative schematization;
4) to deep the knowledge on urban standards through both the disciplinary guidelines and the technical and planning tools at the municipal level, trying to understand the practice and processes related to the construction of the services' design process;
5) to investigate the international regulatory framework and practice in planning urban standards, in order to highlight further significant aspects that are not evaluated in the Italian scenario;
6) to identify the evolution of types of services and the basic principles for their innovative planning;
7) to choice and study the mathematical tools, techniques, and methods which, if opportunely integrated with each other, can improve the decision-making process;
8) to define a planning methodology that can lead to the optimal location of community facilities and services.

The aspiration of the methodology and the research is to meet the objectives of the service's policy in a consensual context, that goes hand in hand with the drafting and approval of the Municipal Urban Planning.

1.3 METHODOLOGY OVERVIEW

The research employ, broadly, a deductive methodological approach to investigate the challenges facing community facilities and services.
The work was divided into two phases: the first one was reserved for the construction of a solid theoretical basis on the phenomenon under investigation, and the second was characterized by the definition of a methodology for planning, design and verification of urban standards, and their application to different territorial contexts.
The first part of the employed research method is based on a significant literature review, characterised by the reading of urban literature texts relating to concepts of equipment, facilities, endowments, requirements, standards, public service, and the models and techniques for planning and location of services. Simultaneously, some planning tools, that standardized the project of facilities, have been studied. The analysed materials are numerous and very heterogeneous, aiming to cover a span

of rather broad and diverse experiences. The analysis of the disciplinary practice, relating to different construction routes of the project within the ordinary planning tools dedicated to the theme of the local equipment, such as the Piani dei Servizi (Plans of Services), has identified certain recurring technical and procedural leanings, the critical nodes and the innovative experimental tendencies.
The analysis purpose has been to obtain alternative and innovative methodological orientations. Indeed it has allowed the definition of several elements and various principles that must be taken into account for the implementation and planning of the traditional and new services.
Starting from the previously discussed concepts, a methodological proposal was developed to evaluate the system of urban standards quantitatively and qualitatively, in order to fully understand what the priorities are and what benefits they can bring.
The methodological proposal has been divided into three phases, to which different tools and techniques are associated, such as the multi-criteria analysis, the set covering model by the Operational Research, and the spatial analysis techniques that are implemented in a GIS environment.
The methodology consists of three phases in such a way that it can be integrated with the practice of municipal urban planning, that, already, is widely recognized by law. Moreover, it is integrated with participatory processes, which, according to their position in the 3-phases methodology, can be considered as tools of knowledge of the problems of a territory and the people's needs, and instruments of validation of the model.
The outputs of each phase are respectively: a scenario of possible actions for future strategies, the identification of land areas with a deficit of facilities, and the optimal location of facilities in order to serve and cover the entire municipal territory.
This methodology allows the definition of visions on how it is possible to organize the public tissue with respect to the concepts of urban regeneration, spatial justice, quality of life and sustainable communities.
Figure 1.2 allows the understanding of how the thesis has been organized.

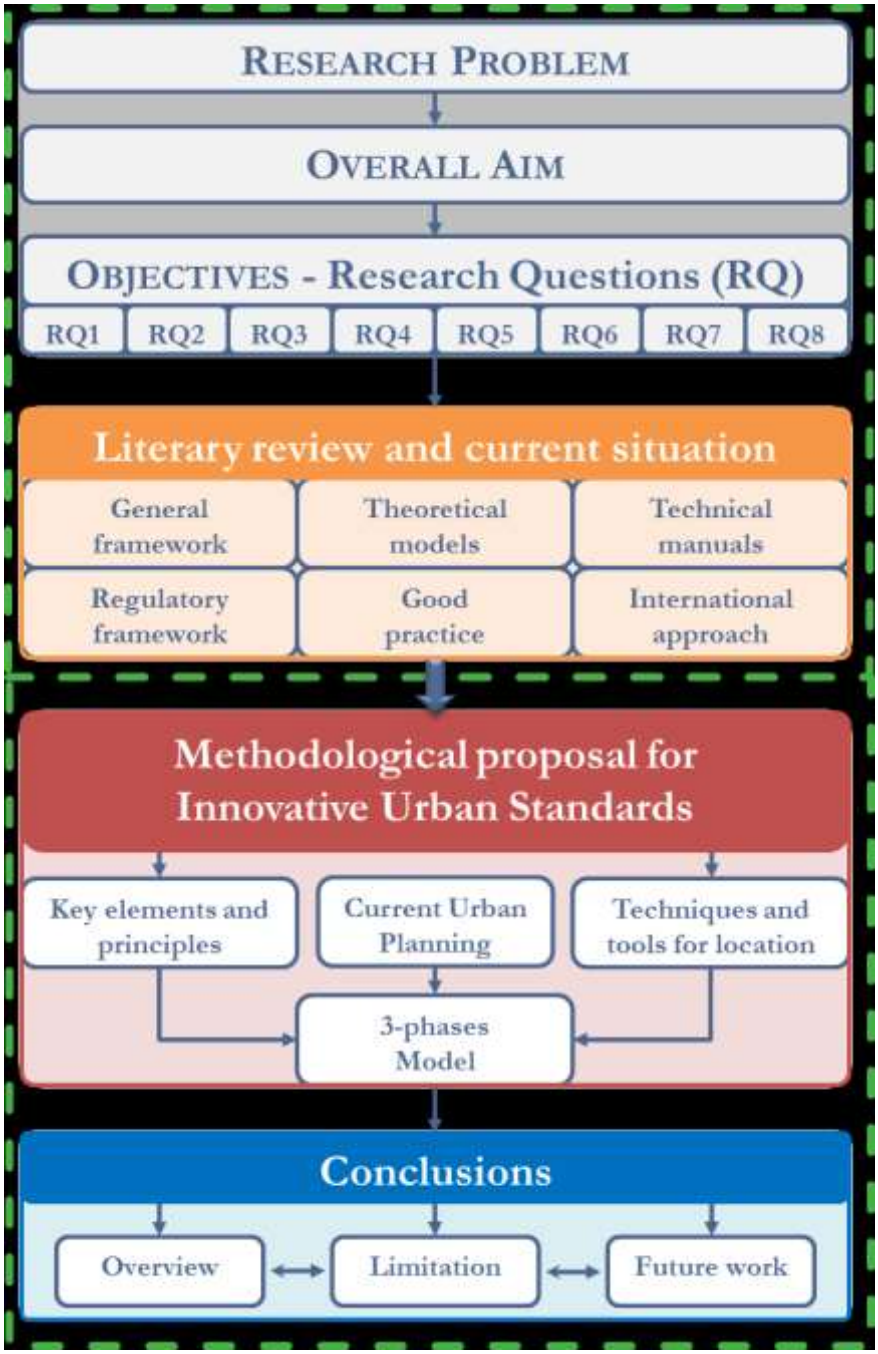


Figure 1.2 Overall research design

1.4 THESIS OVERVIEW AND STRUCTURE

The research project is divided into two sections, which are organized into nine chapters.
The first section refers to the analysis of the current situation, with the clarification of issues related to the planning of services, their regulatory definition, through a careful research of regional, national, and international laws, and the practice, through the study of national and international best practices.
The introduction (Chapter 1) is followed by four chapters of analysis, which are described below.
Chapter 2 starts from the evolution of the concept of urban standard, understood as the urban quality generator to be defined through regenerative policies, to gain awareness of the need for a renewed welfare. Both must consider new ways of living and a more complex question that reflects varied needs.
In Chapter 3, an overview is made on the schemes and theoretical models, and on the technical and scientific contributions able to explain the ratio between the different dimensional and functional parts that compose the urban structure.
An analysis of the current legislation tools on the subject of the urban standards (Chapter 4), simultaneously with an analysis of best Italian and international practice (Chapter 5) and, characterized by a brief survey of some parameters for the evaluation of services, has led to outline a study on the introduction of qualitative and performance attributes for services. The innovative elements found within the production of some regional regulations seem to reflect a need to study the issue of quality instead of quantity of facilities and services related to the phase of analysis and land reconnaissance. In addition, the analysis of the application to real cases of planning services determines the definition of qualitative attributes to meet a demand that must be detected and monitored, even when the service is not still active, providing for their effectiveness on the basis of the actual demand.
The second section defines the methodological proposal, through the identification of the guiding principles of innovative standards and a methodology, based on the application of techniques, models and tools, able to define a services' planning process, which may be the basis of the location choices. It contains the three chapters of the proposed methodology and final conclusions.

In Chapter 6, the new approaches and content in services' planning are defined, with the articulation of a charter of services, within which guiding principles are recalled, and the identification of new services, that reflect new ways of living.
Chapter 7 defines the chosen mathematical models, techniques and tools that, integrated with each other, allow the definition of the methodological articulation.
Chapter 8 provides an innovative approach to the design and planning of services, that can be considered as a dynamic process of assessment of solutions, through the definition of a three-staged methodology. Each stage, perfectly integrated into current urban planning, corresponds, through the use of a technique and a different model, to an output whose meaning is consistent with the design stage to which it is associated.
Chapter 9 presents a summary of the main findings, an indication of how the methodology can influence planning decisions and the conclusions, as well as suggestions for future work.
In order to understand better the link among the several chapters, each one is characterized by an introduction that explains its articulation, which is also made clearer through a diagrammatic representation, and a summary that allows their conceptual integration. Moreover, each one of the following chapters contains a paragraph on the background context as a general overview of their arguments.

1.5 CHAPTER SUMMARY

This introduction focuses on the context of the research and the research problem, its aims and objectives, and through the articulation of the methodological approach, it has been possible to organize the structure of thesis into nine chapters.
Starting from the definition of thesis, chapter two will focus on the relevant literature associated with urban standards and how these have evolved, through a resume of some of the themes at the centre of the debate and the identification of the most significant problems that have been actually encountered in the planning, organization and implementation of public services.

2 URBAN STANDARDS AND NEW DEMAND IN THE CHANGING CITY

> "The city (…) is something more than a congeries of individual men and of social conveniences- streets, buildings, electric lights, tramways, and telephones, etc.; something more, also, than a mere constellation of institutions and administrative devices-courts, hospitals, schools, police, and civil functionaries of various sorts. The city is, rather, a state of mind, a body of customs and traditions, and of the organized attitudes and sentiments that inhere in these customs and are transmitted with this tradition. The city is not, in other words, merely a physical mechanism and an artificial construction. It is involved in the vital processes of the people who compose it; it is a product of nature, and particularly of human nature".
>
> (Park et al., 1925).

An appropriate urban fabric can transform the liveability of a place and comes from a set of tangible and intangible features, evolving continuously. Without a balance between the built environment and the urban facilities and services, a city can go into crisis.
In order to introduce the chapter, it is important to highlight that urban standards can be seen as symbols of collective well-being and regeneration. In fact, current models of development of the cities, based on renewal and enhancement of the urban tissue, consider urban standards as a network of community facilities and services which improve the quality of life. Obviously, this public structures must reflect the new needs of population, which evolve continuously in place and time. In order to guarantee an equal provision of services in a municipal territory, the reference to spatial and social justice must be considered. However, because of the actual economic scenario of crisis, the welfare state is not more able to respond efficiently to the social demand. This

leads the search for new way of provision of services, which involve the private sector and processes of inclusion and social cohesion.
This general issues regarding urban standards will be argued in this chapter. The diagrammatic representation of its structure is showed in Figure 2.1.

Figure 2.1 Chapter 2 diagram

2.1 BACKGROUND CONTEXT

Policymakers and institutions focused their concerns on the urban population, because more people live in cities than in any other type of location in the world. In 2050, the population in cities will have grown to about 70% of the total world population (United Nations, 2015). As a consequence, the challenge for current cities is to tests their capacity to provide a good quality of life for their population. Cities are changing rapidly, and a good way to make progress is to understand their past in

order to construct their future. In this regard, evaluating the normative urban actions that have changed people's way of life can contribute to building better urban environments.
Today, the city is no longer characterized by a continuous development of the urban settlement but, instead, it needs actions of redevelopment and renovation of its spaces and its internal areas. Consequently, for the new culture of sustainability and urban quality, the territorial endowments become the core and the vitality of the city, which allow buildings and the urban structure to exist fundamentally.

2.1.1 Community services and well-being

The collective level of wellbeing depends on the capacity of service provision. According to the report on the perceived quality of life in the European cities (European Commission, 2009), the top ranking positions are occupied by the cities offering services, good infrastructural networks and an efficient public transport system, endowments and green spaces, opportunities for work and leisure, safety and order, and a lifestyle at affordable costs.
Wellbeing is not a simple concept. An operational definition of the concept of social well-being eventually relates to human happiness or the capacity of an individual to realize his/her perception of good life (Smith, 1973: 67). More precisely, many factors affect it and where it occurs, including social welfare, standard and level of living, social satisfaction and the quality of life. However, there always remains a problem to define these terms precisely.
It is significant to focus on the concept of quality of life, that represents more than the private living standard and refers to available and accessible social and public infrastructure, as well as an environment without serious deterioration or pollution. The concept of quality of life is multifactorial in nature ranging from narrowly conceived personal well-being to the wider environmental and social setting (Fadda and Jiron, 1999). It is strictly connected with the cumulative distribution of important public and private goods such as health care, education and welfare services, protection against crime, the regulation of pollution and per capita resources availability. Such conditions are not generally met in most of the cities since a large part of the inhabitants lives in dwellings and neighbourhoods lacking basic facilities and services. In particular, environmental quality has been accepted as the undisputed component

of the quality of life, even if leisure, economic security and family life have the highest importance for good living in most of the studies.
A broad variety of models has been generated for urban environments and quality of life. These range from highly theoretical models to empirical-explorative models stemming from different disciplines (Kamp et al., 2003). Till now, geography has mainly borrowed the theoretical framework for well-being studies from economics (Smith, 1977). Harvey (1978) elaborates that there is an urgent need to combine social imagination with geographical space. In true sense, the social imagination confirms that man realizes the meaning of his existence only in the context of society he lives in. According to him, geographical perspective "enables the individual to recognize the role of space and place in his own biography to relate to space he has around him and to recognize how transactions between individuals and between organizations are affected by the space that separates them. It allows him to recognize the relationship which exists between him and his neighbourhood".
Urban policies developing the quality of life focus on the relationship between people and their everyday urban environments (Pacione, 2003). Urban environment problems are multidimensional, stemming from private and public agents, economic circumstances and environmental conditions. How urban planning containing the necessary services for the population can be used as a tool to redistribute wellbeing among the population.

2.1.2 The role of facilities in the urban regeneration

After the changes in the social and economic structure of the city since the early eighties, which have gradually shifted the interest in the recovery of urban spaces, the role of urban standards is questioned. They do not seem to be more really in proportion to the new spatial needs, as well as they are considered a rudimentary parameter subject to further refinements, in relation to the new features of re-use interventions, which are characterized by high density and destinations, mainly multifunctional (Erba, 2003).
In the ordinary approach, regeneration practices of spaces can be observed that becoming available in the historical centres, were intended for interventions of new housing, offices or business, without pay particular attention to services, which are been moved elsewhere, in less

attractive and valuable areas. Analysing the European best practice aimed at limiting the land use, the most used and effective strategies are connected to urban densification and re-use of brownfield sites. One of the keys to sustainability consists, indeed, as a result of densification, in reducing the gap between people and between people and their displacements, since there is a reduction of the energy consumption, emissions and waste. Also, the Italian legislation, in exception to the ordinary urban planning, paying particular importance to the interventions that aim at rehabilitating degraded areas of the territories, provides an important opportunity for building and planning transformations, from the point of view of the densification and, at the same time, the minimum land consumption. However, the changes proposed by these rules, while improving the environmental quality of the city, through the conversion of disused and degraded areas with interventions at zero land consumption, are not sustainable from a strictly urban point of view, in terms of liveability and vitality of the city itself.

The reasons that combine the concept of sustainability, urban regeneration and quality of life are of economic, environmental and social nature essentially: Musco (2009) describes the sustainable city as a holistic system that should be thought as a whole. Regenerating the city and its territories have the meaning, therefore, on the one hand, to adopt visions and operational tools able to act on the structures, the hardware, but also, on the other hand, to work on resources, on energy, on identities and conflicts, on the software, since the city is an ecosystem with a material and immaterial balance[3]: physical structure and intangible processes that break and reconstruct continuously.

The regeneration policies are really complex for their features[4]. They imply an innovative challenge of a whole range of aspects: a more careful and aware negotiation between public and private sectors, a greater

[3] Evans and Shaw (2004) define the urban regeneration as the "transformation of a (residential, industrial or open space) place that shows symptoms of environmental (physical), social and/or economic decline or, rather, as the infusion of new vitality to declining communities, industries and places, brings sustainable and long-term improvements to the local quality of life in relation to the economic, social and environmental aspects".

[4] Urban regeneration can affect existing buildings both in a widespread way, improving their energetic and static performance, and at the level of urban tissue, redefining the morphology, raising the quality of public spaces, of territorial and environmental endowments, of accessibility in transport terms, promoting social cohesion, thereby helping to alleviate or solve the malaise and degradation, if any.

ability to share the choices through the activation of participatory processes, the full implementation of town planning regulations in force with all their fundamental principles but, at the same time, also the (strategic, structural, and operational) planning upgrade that is necessary in order to implement these changes in the existing city. New forms of the Plan have to be looked for allowing the evaluation of the Urban design (without any kind of separation, even temporally, between planning and construction) and its conformation specifically.
Urban regeneration must be implemented through appropriate intervention strategies to the actual conditions, providing targeted interventions, that have to be incorporated into a more complex and structured vision. Thinking of the regeneration projects such as complex processes, starting from the theories of Habraken (1972; 1998) and Alexander (1964; 1975; 1977;1979; 1985), urban regeneration becomes a "stimulation for points" that can contribute to the emergent behaviour wanted by the municipal administration's premises. A partnership approach between the parties leading to a hybrid strategy that prefigures mutating spaces, open systems, interstitial projects that become references of the new planning: a project in constant progression, place of solitary ads, able to rebalance a system of relationships and relations which today are totally inharmonious. Moreover, practices for recovery and rationalization of the existing tissue are inspired by lifestyle gradually more sober, in a political and institutional context that sees a growing demand for accountability and legitimacy to the autonomy of the choices by the part of local authorities.
The strategy for urban regeneration through the networking of facilities and related services can be implemented through the planning capacity and the identification of synergistic actions. Furthermore, different moments of analysis and different modes of intervention have to be provided, able to combine an objective examination of targeted short-term actions and the large-scale indications of restructuring on longer times.

2.2 THE EVOLUTION OF THE CONCEPT OF URBAN STANDARDS

The Urban Standards, which are not understood for their quantitative requirements but in terms of quality of housing and collective well-being, seem to be needed to mend the urban tissue already built heavily, in order to adapt it to new needs. Therefore, the focus passes from the insurance of a reserve of public areas to that of the actual planning of spaces really usable and organically inserted in the urban and regional context.

Generally, the reference is to a changed concept of urban standard: it passes from abstract allocation of areas to the definition of those conditions that, according to Odorisio (1999), must be "capable of providing a real allocation of services and collective facilities for the city, in terms of creation, maintenance, management and, therefore, the actual use by citizens". The focus is on the ability to provide certain benefits, by defining community facilities[5] and services[6] as, respectively, the "container" and "content", and the "standard of performance" is applied to the second one.

With regard to the new performing standards, it is necessary to consider the impossibility of defining a priori parameters, independently of the context, but only in close relation to the specific urban and regional environment to which they will be applied. This means that it is necessary to modulate the service's categories according to the real needs expressed by the demand side, while the available (financial and real estate) resources, the actors and the bid procedures gain significant importance on the supply side. Particularly, for the already established urban areas, a realistic argumentation about resources takes into account of a built reality, characterized by open spaces and objectively existing or recoverable properties. For the construction and management, it is necessary, instead, to face a new framework that involves both public

[5] The community facilities are the buildings and structures in which the services are housed and through which they can be delivered, i.e. they represent the service's containers. Compared to the residential buildings, the spaces for facilities are recognized by their physical structure, generally adequate for the type of activity that they house, or simply differentiated by size and features.

[6] The services account for all those activities necessary to the organization, transport, delivery and management of tangible and intangible assets useful to community life. The urban services are those offered to all citizens on an ongoing basis, able to respond to the collective demand for education, health and care, hygiene, security, mobility, culture, recreation, sports and administration.

and private actors directly in the implementation of community facilities and the provision of services, and, in parallel, to define the necessary organizational and managerial skills. The latter is closely related to the functioning of public administration and connects the definition of new qualitative standards to the major themes of the welfare redefinition and the public-private relationship.
Moreover, conceptually, the inclusion of qualitative standards must be considered in the urban planning, namely: the prescriptive or addressed/evaluative essence that they can take on, and the level of planning in which they must enter, or whether they have to be inserted in the strategic or operational plan. In order to adapt to suit the needs and the local opportunities and resources, the concrete definition of actions, that have to be carried out, have to be necessarily contextualized within specific projects and programs, while only the definition of quality objectives is more appropriately determined in the strategies (structural plan), where it is possible to integrate them with policies or systems already in place. More than a need for coherence and more effectiveness, the conjugation and the integration between urban policies and other municipal policies are necessary, and, in this way, the actual operating limits of the discipline are not exceeded in a utopian manner.
Finally, a new concept of the quality system emerges, which does not have individual, physical or qualitative aspects as its object, nor the provision of services, but the efficiency and overall quality of the urban system, including aspects of a different nature and their multiple and complex interrelations.

2.3 URBAN STANDARDS AND THE EVOLUTION OF NEEDS

The exhaustion of the long season of the quantitative planning leads to the indispensable reflection on the supply of urban services and a strong focus on urban complexity for the identification of new approaches to urban standards.
Whether more than sixty years ago, the model of the rationalist city was hired, with its kit of separation between the various urban functions and the predominant attention to the issue of urban sprawl respect to other themes, today, the city's problems are defined in a completely different manner (Cáceres et al., 2003).

The separation and isolation of the service functions, the reduction of the complexity regarding the notion of space of public use to that of the collective facility, the illusion of being able to approve and normalize responses to diversified needs by their nature, constitute some of the more obvious limits of the functionalist urbanism. Therefore the complex structure of the city, according to that approach was reduced to a simple mechanism, whose government seemed possible with tools such as zoning, the building type, the building and urban planning deeds. The city was represented by a model consisting of a few simple and rough numerical parameters.
Today, planners have changed their idea on the city, as well as the needs, to which the urban standards should give an answer, have changed. In this sense, it is necessary to respond, also through the urban standards, to the new requirements posed by the actual society, that are expressions of the changes from the demographic, social and cultural point of view (Contardi, 1999). New needs express new concepts, new development indicators and new forms of construction of the plan, which must produce new relational standards, as opposed to those of functionalist derivation. The rationalizing tool of the zoning must be replaced with the location choices, which must be more responsive directly to territorial localisms, in terms of social, economic, ecological and environmental needs.
Taking all this into account, the municipal administrations are called to play roles fairly complex, as they must find, in most cases, innovative solutions which are able to interpret the urban standards in relation to the new needs.

2.3.1 The city in progress

In recent years, the way of changing cities is a central topic in the debates of the sector. In general terms, it can be assumed that the city of planners is primarily a place to be restored and optionally thicken and that the expansion, i.e. the consumption of new soils, has to be avoided. Whether just this is not possible, through a well-documented awareness, the compact settlements may be preferred, for reasons of economy and functionality of services, since urban sprawl is totally demonized.
In addition, Cáceres (2003) considers that the concept of the city is actually dissolving to make way for a broader concept, meant as a territory, what today is referred to as built environment. Therefore, the

quality and sustainability of this space or environment can be achieved, beyond the traditional relationship between town and country, which must be approached from a social and geographical perspective, as well as from that peculiar to the urban planning technique. In any case, the traditional dichotomy between geographers, ecologists and planners must be broken, highlighting the warning of changing the interdisciplinary modes defined in the second half of 1900. Only through the enhancement of priority environmental and sustainability aspects, the disciplinary integration can be reached, which addresses the issue of transformation of space from a different perspective.
Other points of discussion for the evolution of the city are (Cáceres et al., 2003):

- the introduction of indexes and parameters for measuring the quality of urban space, comparing it to the density of buildings and open spaces;
- the idea that space is a non-renewable resource, paying particular attention to the effects of the impact of infrastructures;
- the added values to the operations and the uses that are allocated in the territory must be balanced both socially and economically;
- the contemporary society must be considered, in its flexibility, as a complex society made up of multi-ethnic values and cultures, and, therefore, it is necessary to understand its changing and diversified needs.

Finally, there is the need to recognize that the provision of services for the contemporary city requires to draw attention to the specificities of the different sectors of society (young people, old people, women, marginalized and immigrants), as well as to overcome the basic level of the services, that should be satisfied, in order to be able to appeal to all those services, until now considered sophisticated and of upper level, which often do not require a specific location and which do not fit within any urban threshold.

2.3.2 New needs

The changes in society transform all the emerging needs in diverse, fragmented and geo-referenced needs (Fazia, 2002), which become consequently the expression of a complex and rapid changing society. While it is necessary to continue to guarantee a defined quantity of areas

for services, the reply to new demands of quality has become increasingly important. In this sense, a few new concepts are appearing such as the real needs, about which the effective demand of the population on a given service is considered, avoiding the projections over the time, or the desired urban standards, which take into account the fact that the only concept of need is not as important for some persons as the concept of desire (Ricci, 1999).

The quality of life is inherently associated with the degree of fulfilment of individual and collective needs and wants. The higher the degree of fulfilment of the needs and the wants, the greater is the quality of life. According to Knox and Cottam (1981)"well-being is (…) the satisfaction of the needs and wants of the population". Except for a few basic needs which are scientifically established, most of the needs and wants are culturally and historically specific. As needs and wants are fulfilled in specific social, economic and political contexts, they vary from one place to another. Therefore, the needs are not permanently classifiable, as they are affected by cultural, spatial and temporal variables. However, Maslow (1943) argues in his theory of needs that people's behaviour, even at work, tends to the satisfaction of needs arranged in a precise hierarchy, that he has shown in a pyramid. Each individual feels his needs in a vertical format: in the first level the physiological needs are placed, then those of security and finally those of solidarity, respect and self-realization. Everyone, having met the needs of a certain type, shifts his attention on the needs of the next degree (Fig. 2.2).

The need depends upon the stage of development of the society. The primitive society will be preoccupied with survival and security concerns. To prove the point that some needs are basic, Smith (1994: l28) argues that: "they are needs we all have just by being human.(...) We usually speak of basic needs as if they were not only basic but absolute: humans need food and rest and health not for anything; they just do.(...) they are what we need to survive, to be healthy, to avoid harm, to function properly. (...) well-being (...) is the level to which basic needs are met".

Today, the needs have changed, as a consequence of both their natural evolution towards more sophisticated ones, once sufficiently guaranteed the basic ones, and the current social changes: the raising the level of education, which increases the demand for culture; the effects of immigration and, therefore, the development of new demands and their diversification; the growth of the elderly population; the increase of leisure time and improvement of health outcomes. Cáceres et al. (2003)

believe that the expressed new needs by the weaker sections are obvious and push to develop integrated and differentiated replies. For example, the elderly need new physical locations for services and especially new organizational models of both services and cities; the children look for a more liveable city in the sense of paths, schools and structures for education and open spaces; the young people require adequate facilities for the autonomous organization of their lives and free time; the single women, with family load, need more suitable services and cities to their times. Furthermore, the major topics related to the new needs of the community regard the relationship between the macro and micro dimensions, the ethnic forces, the issue of multiculturalism and the way the social system is organized. Appropriate spaces are required by the volunteering, which has assumed large dimensions, and immigrants, with their different cultures, religions and customs. Finally, the city users, tourists, workers and non-resident students require infrastructures and services that give better answers to their needs.

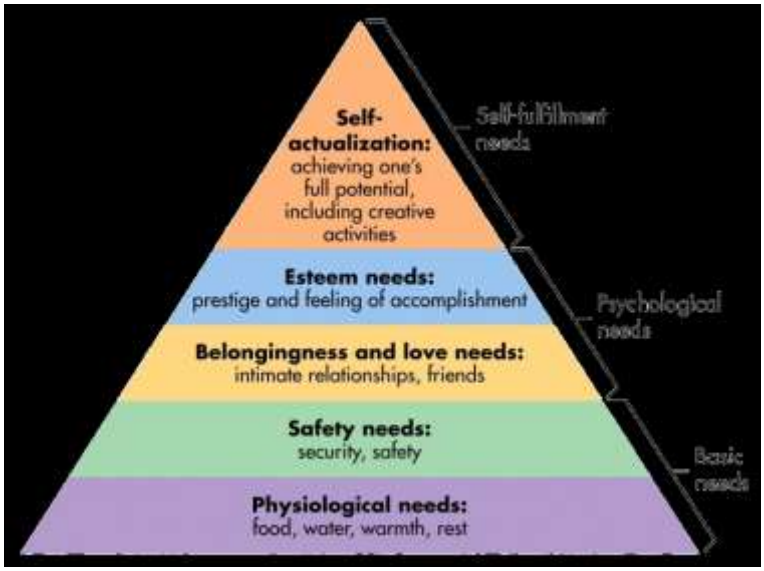


Figure 2.2 Maslow's hierarchy of needs (1943)[7]

These are the needs of particular groups of users of the city, but there are also the internal requirements: security, at all levels, from that of

[7] Source: McLeod (2016).

social nature, petty crime and more recently experienced terrorist problem, to that relating to the risk factors related to the environment, and the physical accessibility of the city in general and the facilities of which it is composed.
All this shows how the framework of the problems, the uses of the city and the activities that must be considered, imagining a redefinition of urban standards, is certainly very wide and articulated. In addition, this reconfirms that the purely quantitative reference to areas is not sufficient and does not adhere the needs that are reflected above all in different organizational models of the city.

2.3.3 Interception of needs and demand for services

The methodology for the identification of needs is similar to that of marketing, used commonly in business to probe the customers and their expectations. This identification and survey of the needs must take into account the characteristics of the population and the specificity of the territory. In the guidelines for drafting the Services Plan, edited by the Lombardy Region (2005), the need to take into account the specific needs of each age segment, of each social and professional category that constitute the population is stressed. Furthermore, each territory is unique and its needs for services are characterized specifically: they will be different in the plains and in the mountain area, depending on the characteristics of the road network and the weather conditions; they will be different in the areas densely urbanized and rural areas, in developed regions and in dominant rural regions (for example, the population's need of taking advantages of public green areas is notoriously much felt in urban areas than in rural, hilly or mountain areas). Consequently, the action in services planning should be guided by the ability to adapt them to the specific needs, contrary to the expectation of a universally valid standard, in an alleged possibility of homogenisation of the needs in different territories.
Characterizing the demand in relation to a specific territory means, first, determining the ways of life of those who live that territory. Simultaneously to the changes in the urban context, the society has changed, as well as its demand for services. A new articulation of the social segment corresponds to a change in the way of experiencing the city and, therefore, the emergence of a framework highly fragmented of the demand for services. The demand for new services is dependent on

new uses of the city and the territory, that are in turn linked closely to new lifestyles and use of the time by individuals. Consequently, a careful analysis of the demand becomes necessary: "From the rough analysis on the population from which the quantities and perhaps the quality of the user arise immediately, it is necessary to replace an interpretive process of knowledge of the ideological and institutional mediations through which the needs can be expressed" (Clementi 1983: 64).
The identification leads to define two types of needs: the basic ones, that must be fulfilled for the entire population, and specific ones, only for certain categories. Among these, the needs expressed by enterprises of all sizes and those of environmental protection cannot be forgotten: in this sense, it is important to involve all stakeholders in the analysis of needs. From a methodological point of view, a list of needs for services must be considered and analysed, in accordance with recognized priorities, with reference to the types of resident population in the territory, and to people who are accepted temporarily (secondary residents, tourists, students and workers), the so-called city users. As for the identification of existing services in the area, the analysis of the needs for services for a population can only be carried out effectively for major cross-cutting themes: health, security, education and training, work, transportation, culture, communication, entertainment and environment. The initial goal is to define the needs related to each thematic area in global terms. Then, the next step will be the identification of the segments of the individual areas of need that pose most urgent problems than the others. For example, the transport needs in a region can be developed in many ways: transport from home to work, pupils transport, emergency transport (health-safety), transport of elderly, of citizens without private means, of connection with the nodes of the motorway and railway system, of urban transport.
Equally important, it is necessary to consider the evolution in terms of perception of needs and characterize the demand in relation to perceived priorities. The expression of certain needs of services obeys fashion phenomena and should be analysed carefully: the demand does not always correspond to a real need, and sometimes, it can be deemed to be achieved in a satisfactory state of accessibility, or other needs are implied or do not find a way to express themselves. The evolution of needs for services must be based, therefore, not only on the listening skills of the population but also on the desire to help people to explicit their needs.

This, like any experimentation, requires maximum flexibility and adherence to local contexts, and, therefore, the most suitable culture tool seems to be the urban planning primarily. The same demand becomes the input of urban, spatial, functional, managerial and administrative design. In this way the welfare demand can be transposed in a methodology for a service plan that takes its form of government tool of the urban transformation, i.e. the place where it is feasible the redistributive design of the social and urban compensation, thus activating the urban regeneration.

2.3.4 Revisiting the Urban Standards

The reasoning for standard leads to substantial simplifications compared with the complexity of urban design issues. The standard presupposes to bring the behaviour of individuals and social groups to a pre-coded behaviour and simple functions: in this sense, a radical critique of the standard should lead to their rejection because they would be the tool (apparently technical and, therefore, neutral) behind which it is possible to read the ideological attempt to bring the collective and individual behaviour within a predetermined and oriented principle. For example, places such as the square or the street are generally regarded as technical functions essentially useful for the traffic and the transport of goods and people, while the complex symbolic function which is exercised there in moments of collective meeting, socializing and mass mobilization (demonstrations, marches, and celebrations) is almost never caught. The urban planning, very often, adapts to this functionalist interpretation both to a reductive level of the standard and a more qualitative level of the image and furnishing of the street and the square.
The original conception of the standards arising from the functionalist model and based on the concept of balance in the relations between the different land uses and the different parts of the city has gone into crisis with the transition from an industrial society to a society oriented to widespread tertiary sector and characterized by a more complex use of urban resources, where the lifestyles have changed and, simultaneously, the social demand for the use of space has changed, too. It is essential, for example, to draw attention to the sector of the elderly population: in almost all countries of the world, the percentage of the population over sixty far exceeds that of minors. Evidently, the incidence of the needs of these age groups is largely different from those used as an implicit,

theoretical and practical basic of the planning and design of the modern city and whose zoning and standards represent two of the main tools. So, the accessibility and mobility become relevant factors and, in this way, the size and morphology of the city together with the services and modes of provision, supply and use of them become key factors in the formation of the urban quality of life. According to Palazzo (2003), significant implications are represented by overcoming rigid sectoral diaphragms in the name of an overall conception of service to the person and by the demolition of the physical boundaries configured from the traditional catchment areas.

As a consequence, the points of reflection for the revision of the urban standards (Cáceres et al., 2003) are the following:

- the addition of new items of standards that serve to highlight the qualitative characteristics required for the works of the secondary infrastructure of the territory (or sometimes, more generally, to define the qualitative requirements of the various proposed interventions);
- a new way of formulating the standards, through a quantification of the different aspects that define the location and the distribution of the different facilities and services (for example through the use of coefficients and scores to be applied to different areas and facilities in proportion to their actual performance or, the adoption of parameters that serve to evaluate the different objects that play a role in the public and private relationship);
- a detailed list, in narrative form, of the requirements and performance, that facilities must have and a case by case assessment of the actual compliance of these requirements for the existing and planned services.

A further consideration is that the belief that the growing and varied articulation of demand could be coped through an increased quantity of the supply, realizing an adequate stock of new facilities, has been abandoned. Today, the previous belief has been replaced by the idea that the upgrade of the supply may be pursued, in particular, through better management of existing equipment, favouring the organizational and functional aspects (performance standards) than the physical and structural ones (quantitative standards).

2.3.5 The services from the side of needs

Several aspects that characterize the services will have to be considered. First, the service must be immaterial, i.e. it can never be fully defined nor completely verified at the time of its provision. In order to have the contemporary presence of contiguity and simultaneity between the production and the delivery of services, the inseparability must be settled, with the meaning that at the moment in which the service is created, it is also delivered. The aspect of the perishability indicates the capabilities of the available services, which must be used in a given period otherwise they are wasted, and, finally, the heterogeneity indicates the variability of the services depending on the user's circumstances, who benefits from them.

As regards the types of services that must be performed, they are linked both to the fulfilment of the necessary established needs and to those emerging from the changed framework of needs. There are entire neighbourhoods where basic needs are not being adequately guaranteed and in which are required, for particular situations of social disadvantage, actions able to define a different calibration for services, by paying more attention to those that provide assistance, security and opportunities for social inclusion for marginalized. In these contexts, it is clear that the need to take urgent measures to combat the spread of social problems takes priority over the evaluation of the performance requirements of the services, related to their productivity and efficiency.

An additional feature on the basis of user's satisfaction is that of the functionality of urban and/or territorial space in which are located the various facilities, i.e. the places of dispensing services. In fact, the integration of tangible and intangible services is largely depending on the quality of the organization of the space. A functioning city enhances the functionality of the services, by facilitating access to the various equipment, allowing their location in responsive, skilled, pleasant, comfortable places for all users. Hence the need for the services and the urban planning must proceed simultaneously. Moreover, it is necessary to territorialise the social services in order to create a real network of well-organized services in the territory. In fact, the specialized social services are often concentrated in specific spaces within the metropolitan area, so it is important to define the spatial and institutional boundaries on which they insist. Often, the administrative boundaries are not related to the integration of social demands, even if they are significant for the

joint organization of the supply since they establish the demarcation rigidly. However, the horizontal subsidiarity is not symmetrical to the vertical one. The public administration must undertake a number of actions in order to adjust the characteristics of the area to the expectations of the inhabitants, must animate the territory, with the aim of creating synergies between the subjects within it.
Only in this way it is possible to make the switch of the concept from passive users of standardized interventions to customers of personalized, differentiated and flexible services, able to adapt to the needs of different classes of users, including through the introduction of uniform criteria for the classification of their needs and responses.

2.4 PROVISION OF SERVICES AND *WELFARE*

The welfare state, essential to the socio-economic growth, has allowed over time the decent livelihoods of the poor class of the population through the giving of public services (education, health and safety) to the whole population, guaranteeing precise assistance rights. The welfare's presence that has produced strong social benefits and "(...) the formation of a collective conscience of the citizen equal in rights as well as in duties", now seems to have completed its task (Bauman, 2004). The welfare's downsizing affects, according to Bauman (2004), the rebalancing of the collective well-being, reducing the provision of public services and limiting the overall benefits.
The recent debate on the crisis of welfare state has highlighted, on the one hand, the significant relationships in the made reductions, and, on the other hand, the inconsistencies that may occur between policy objectives and their effects. Through the reduction of the services and the funds allocated to them, the abilities of action and competition of the public apparatus are limited with respect to the private sector, causing a decline in the quality of services and, consequently, criticism and disaffection of the population towards the public service.
The complexity of the identification of the needs and the ability to respond quickly to the demands of the population has led to a different organization of the donation of services, resulting in the modification of the concepts of public service and relationship between public and private entities. The weakening of the welfare concept and its

subordination to the market rules (De Leonardis, 2003) has substantially changed the concept of public interest and its field of action, particularly, by affecting the territorial policies that are related to the policies of welfare. The Government's approach is more related to direct management of services, becoming a manager, promoter, sponsor, (Lefèvre, 2001), and leaving space for self-promotion initiatives of the civil society (Tosi, 1994).

If once the welfare policies were the expression of the guarantor State of the goods necessary to meet the basic needs of society, those essential and universally perceived, now, the same goods and the social solutions related to them must be redefined and clarified constantly (Avarello, 2000; De Leonardis, 2003). They become "field of communications, decisions, actions and interactions, responsibilities and social and public conflicts (...) of which the process of elaboration must not be interrupted" (De Leonardis, 2003). The collective goods, as well as the needs, are thus defined according to the discourses on them, as well as on the conflicts and powers playing for their definition. Their identification, definition and organization must be monitored and contracted simultaneously. The intervention on the territory aimed at the solution of this issue, for its social value, should be considered in a new perspective of responsibility of clarification of the sharing values.

For the urban discipline, therefore, the main difficulty lies in the possibility of interaction between the social and territorial policies, resulting in increased complexity for the identification of the typological characteristics of the required services and of social needs, and also for the most suitable and correct ways for their donation and distribution in the territory. This means the redefinition of the ways in which their organization can really interact with the policies and urban design practices. The simplification, in part necessary, of the definition of local policies for welfare, however, must be related to the variability of local instances. "The theme of urban facilities and collective services is one of the fields in which it is possible to expand and intensify the existing split between objective view of the needs and the real common interest, that is a possible collective sharing of needs and desires related to the territory and its practical usage by a local community"(Roncayolo, 1988).

The theme of local welfare, with all its implications of analytical and planning order, crosses that of urban standards, reflecting the same attempt to qualify the growth of the city, always on the basis of a quantitative/dimensional analysis of the demand for services and the

land needed to ensure the delivery of services. Therefore, the organizational process is intertwined with the issues of urban planning in the estimated and/or adaptive stage of the urban standards, as well as the implementation and management of services. In this dynamic, the most obvious problem proved to be the mismatch with other sectors of the "public", in particular with the field of housing policies (D'Albergo, 2003). If now the process of integration between the operator subjects appears initiated, perhaps it can be noticed the missing of a coordination between the sectors of services and housing policies, to ensure that even the planning tools and deeds must be adapted to the new guidelines. The two areas of action have in common, on the one hand, the interest of the ways in which they express and materialize the individual applications, and, on the other hand, a revisionist power of the forms of their possible planning and realization in material but flexible actions, that cannot be separated from a control and a constant monitoring of the physical and social reality. "From a regulating policy of separation/removal/sizing, there is the move to a policy of control, i.e. to a demand for continuous flexibility and rejection of medium-term policies" (Secchi, 2002).
If the welfare appears renewed under the organizational forms, in an attempt to get closer to the needs of translation of needs into actions, its transposition in spatial terms remains weak (Karrer in AA.VV., 2002). The latter implicitly refers to the planning deeds and tools of physical definition of facilities intended to host the organizations of services, which are direct expressions of welfare policies.

2.5 COMMUNITY FACILITIES AND THE SPATIAL JUSTICE

Urban amenities can be considered as tools for an efficient articulation of the settlements and space justice, which can trigger processes of cohesion and social inclusion. Recently, indeed, new forms of welfare are being implemented, such as structures and processes of association and cooperation for the provision of services. Local communities are thus involved in the reorganization of collective services, in the emerging phenomena of temporary reuse or the transformation of natural and environmental spaces into common goods. Even the abandoned and marginalized and peripheral areas, which, for a long time, have been

considered as a "sick space" (Lefebvre, 1976: 114), are part of the city, and deserve to be reintegrated socially, politically and spatially into their community. The city is endowed with a multitude of public and private spaces that every individual can live for a long time or longer, in relation to his nomadism or his propriety. The coexistence of both of these spaces determines in the citizen the development of an "urban culture" (Castells, 1969: 173) and the "feeling of belonging to the city" (Sennet, 1999: 15). Such spaces become elements necessary to define those social relationships that constitute mechanisms of recognisability with the place and with the community. In these places the citizen exercises his rights and respects the rights of the others, learning the meaning of tolerance and belonging.

In transition from a Keynesian economy to the neoliberal new economy and the progressive financialization of the economy that characterizes the current economic crisis, the emergence of a multitude of social claims and movements from the bottom, has contributed to reinvigorating a multidisciplinary debate on the aims and the values of the economy and public policies (Pike et al., 2007) and has focused on concepts such as welfare and social justice. Although with a more limited media impact than well-being (Stiglitz et al., 2008; European Commission, 2009), the debate on social justice has recently taken on board as a reaction to the current emphasis on the competitiveness and domination of neoliberal formulas in Politics, particularly in Urban Politics (Fanstein, 2010, Marcuse, 2009, Harvey, 1996).

The spatial justice can be defined as social justice in its materializations and spatial representations. It is possible, in fact, to read justice/injustice on all levels. However, if we accept the definition of spatial justice not only as the proper distribution of resources on the territory (Harvey, 1978) but also, as Dikeç and Soja suggest, as a result and process of a social construction in which space and society are dialectically interrelated in their evolutionary dynamics, then the analysis of the spatial justice and political application involves a large-scale observation, at urban and sub-urban levels, where the relationship between space and society is more evident.

In recent decades, cities have been subject to significant transformations both morphologically and functionally, with the consequence that even the dialogues about the city, its representation, its image have been the object of precise marketing strategies in which it becomes somehow a product for market competition. "It is necessary to link social behaviour

to the way in which the city assumes a certain spatial form, a certain geography. It must be recognized that a spatial form, at the moment it is created, tends to institutionalize (and in some ways also determine) the future development of the social process" (Harvey, 1978: 42).

The interaction between space understood as a social product, and justice is an opportunity for social analysis. However, "every geography in which we live has some degree of injustice embedded in it. And they can have negative as well as positive consequences on practically everything we do" (Soja, 2009:3). Social injustice is translated into spatial forms and at the same time, the social organization of space is a producer of injustice. "Spatial (in)justice can be seen as both outcome and process, as geographies or distributional patterns that are in themselves just/unjust and as the process that produce these outcomes. It is relatively easy to discover examples of spatial injustice descriptively, but it is much more difficult to identify and understand the underlying process producing unjust geographies" (ibid.).

There is no mechanical bond, but rather a dynamic and complex process that takes place over time and space. Dikeç makes clear the causal and dialectic relationship between space and justice when he speaks of the spatiality of injustice[8] and the injustice of spatiality. In the first case, justice often has a spatial dimension that can be advantageously analyzed, for example, by studying distribution patterns in the space of the object of study. In the second case, the spatial injustice implies that existing space structures (permanences) are capable of producing and reproducing injustices through space. Compared to the "spatiality of injustice", this is a more dynamic and process-oriented concept.

This conceptualization implies, on the one hand, that the analysis cannot be limited to the phenomenon itself, but must also be extended to the components of the phenomenon, and on the other hand, that form and process are inseparable. In this perspective, the concept of spatial justice becomes a powerful discourse capable of mobilizing political action and integrating criticism and action against the forms of the spatiality of injustice.

[8] This is the case of the Los Angeles Bus Riders Unions quoted by Soja. The decision to build a metropolitan transport network based on efficiency criteria without taking into account the daily mobility needs of thousands of suburban workers is the example of how an unfair political process can enter the space and in turn determine other forms of social injustice, such as, for example, discrimination against access to public mobility for certain categories of inhabitants.

The city is, indeed, not only defined in its physicality of houses, streets, shops, offices, but it is the space of everyday life and the identity of the person who resides there, in opposition to the city represented, using the terminology of Lefebvre, as a place and a metaphor of global competitiveness, where a sort of internal market logic has been implemented in the management of local and urban policies, which has definitively ratified the validity of the discourse on city as a fulcrum of capital attraction through the practice of territorial marketing.
The social policies, therefore, determining the methods of contextualization of physical facilities in the territory must support operationally the urban intervention tools.

2.6 CHAPTER SUMMARY

Chapter two has focused on the relationship between services and well-being, community facilities and urban regeneration. Moreover, the interest of the study highlights how the urban standards are evolving, according to new population's needs, which also reflects and are reflected by the changes in the features and models of cities. An overview is also given to the issue of traditional and new ways of welfare, considering the key factor of spatial justice, related to the actual social justice, in order to ensure the equal provision of services in a municipal territory.
After this specific introduction to the issue of the urban standards, it is obvious to investigate the theoretical models and the technical features that characterize them. Chapter three will evaluate the various urban theories of structuring the city and its functional organization and will finish identifying the different element to take into account in planning services.

3 SCIENTIFIC AND TECHNICAL CONTRIBUTION TO THE DESIGN OF URBAN STANDARDS

> "If two different authors use the words 'red', 'hard', or 'disappointed', no one doubts that they mean approximately the same thing ... But in the case of words such as 'place' or 'space' ... there exists a far-reaching uncertainty of interpretation".
>
> (Einstein, in Rynasiewicz, 1996: 280).

Through this chapter, a significant careful analysis begins in order to define the key elements that characterize the urban standards. The chapter, structured according to Figure 3.1, contains an overview of the schemes and the theoretical models, and of the technical and scientific contributions that can be useful to understand in a better way the formalization and clarification of the functional, dimensional and localized ratios between the various parts that shape the urban structure.

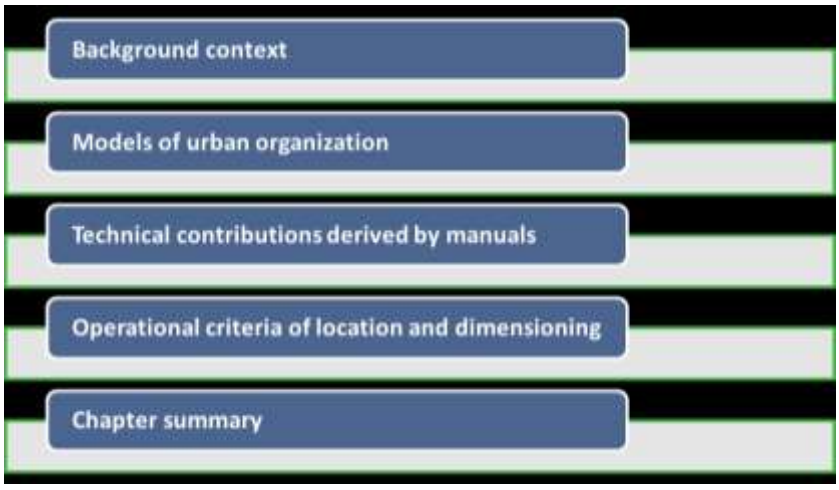


Figure 3.1 Chapter 3 diagram

3.1 BACKGROUND CONTEXT

Attributing to the services the role of "generator system" of functional structures of a city and of the overall urban quality, their project coincides with the design of the supporting structure on which the city is built. It is then necessary to articulate the different parts of the city considering them in their complexity, and integrating them with the logical and consistent development, as well as the completeness and recognisability of the frame (Clementi, 1983: 116).
The need of the modern movement to transfer on the territory a political-ideal model based on equality of all citizens, as a possibility to access to the same quantity of services in their area, has strongly addressed abstractly not only the planning culture but also the concrete contents of the building code. Currently, the awareness of the need to overcome the abstractness is mature, trying to respond to new social needs through an adjustment of the intervention policies, as well as the criteria and urban planning techniques. Therefore, it is clear that overcoming the flattening of the standards and the urban organization's theories, that marked the image of the functionalist urbanism irreversibly, can take place starting from the assumption that the quantity and quality of community facilities can determine the modes and the size of intervention in the urban areas.

3.2 MODELS OF URBAN ORGANIZATION

The organization of the services of a territory is studied in the economic and geographical field, as well as in urban planning. In the economic sphere, the study starts with an analysis of the forces that come into play when choosing the localization of the activities. They are essentially two and act in the opposite directions: the agglomeration economies, that lead to a concentration of activities in the space, and the transport costs, that, on the contrary, support widespread processes of the activities on the territory.
One of the first location models has been proposed by Weber in 1909, who introduced the localization paradigm based on the minimization of transport costs. Then it is possible to move on from the locational choice models by Von Thünen-Alonso (1960) - Fujita (1989), to the central place theory, which originates from the works of the geographer

Christaller (1933) and the economist Lösch (1954). In the first models, the location choices of individuals (firms) are driven by the maximization of the utility function (profit), reached when the marginal costs equal the marginal benefits of localization, while the central places' theory seeks to identify the shape and the organization assumed at the balance of an urban system, starting from the identification of hierarchical principles of organization of space activities.
Within the geographical discipline, three models of the city's growth are introduced: at rings (concentric city), for directions (city areas) or cores (multi-nuclear city). For the industrial cities characterized by intensive development, Burgess (1925) identifies several concentric rings, inside which are located the different functions (Fig. 3.2A, B). The city's growth process pushes each zone to expand on the adjacent, depending on the economic and demographic development. Similarly to the Burgess scheme, whose centre is occupied by the tertiary and quaternary functions (Central Business District), after ten years, Hoyt (1937; 1939) shows the pattern of the city for sectors (Fig. 3.2C), which is based on the principle that other functions are distributed in sectors of a circular area, depending on the price of the areas, the existence of infrastructures for public and private transport and the development of land rent. Finally, McKenzie (1933: 197-198), always in the same years (Fig. 3.2D) formulates a multi-nuclear scheme, with the various functions located in different centres or nuclei within the city. The formation of such centres depends essentially on the functional interdependence between different activities requiring mutual accessibility and the dynamics of land rent. The McKenzie's cellular model reflects well the analysis of urban theories that attribute a decisive role in the transformation of space process to the site characteristics and the changing dynamics of economic and social forces. These three models, however, do not consider the aspect of the close connection between the actual quantity and type of equipment and functional areas of the city, or between levels of centrality and hierarchy of urban functions.

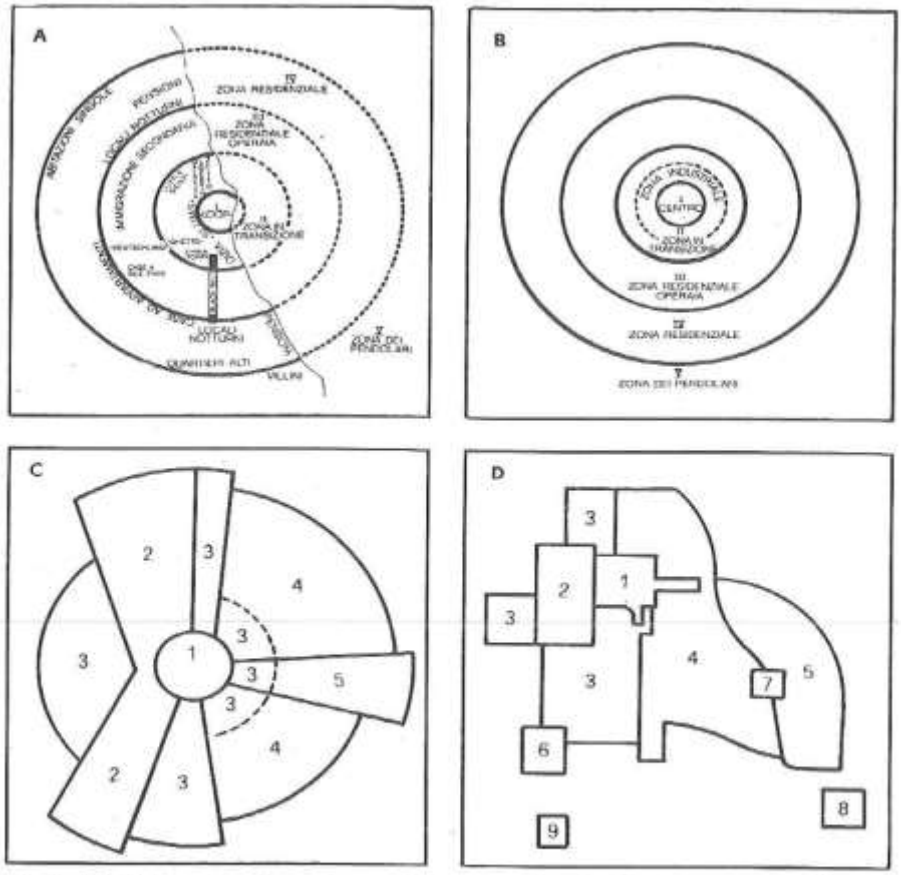


Figure 3.2 Urban organization models: concentric city (A, B), city for sectors (C), multi-nuclear city (D)[9]

A classic model of urban geography that considers the hierarchy of functions and the physical organization of the city is the Central Place Theory, formulated by Christaller (1933), which identifies, generalizing, some hierarchies of settlements within the city and the territory, in function of relations that are established spatially in the demand market and the offered goods. In the above scheme, simplifications are needed on the spatial distribution of the demand, the organization of accessibility systems, and the relationship between production,

[9] Source Carter in Clementi (1983:122): 1. city centre; 2. small industry and trade; 3. low-income residence; 4. middle-income residence; 5. residence in upper income; 6. heavy industry; 7. external shopping centres; 8. residential suburbs; 9. industrial suburbs.

distribution, exchange and consumption. Interesting applications of the model have taken place since the 50s, which led to identifying the provision of the necessary services to the different urban systems, in order to hire a certain level in the territorial hierarchy (Fig. 3.3).

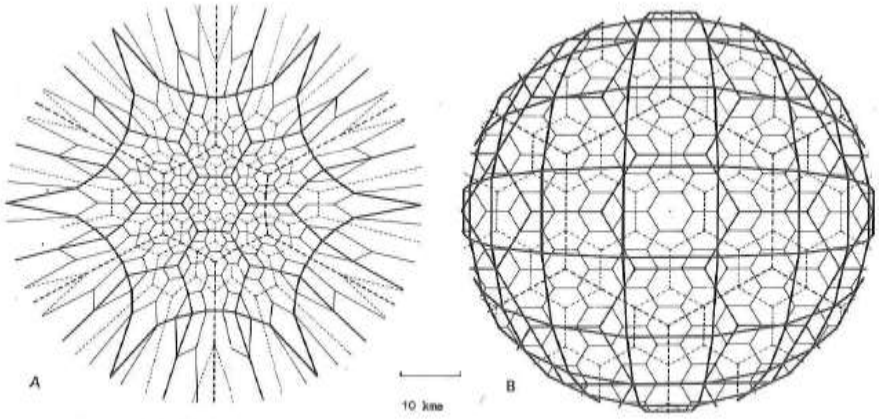


Figure 3.3 Hierarchical structuring of the territory based on the level of centrality for population uniformly distributed (A) and thickened (B)[10]

The theoretical models, however, do not lead to acceptable results for urban planning, since, while defining an order and rationality to the development of the city, they fail to take into account the relevant management problems.

The integration of cellular and hierarchical structuring principles of the functions leads to the definition of a city model that is generally attributed to the functionalist theories of urbanism. So the functional levels are defined. Within these levels it is possible to evaluate the systems of residence, services, communications and production, and also their dimension is defined in terms of population and spatial extension[11]:

a) the basic level of the *dwelling unit* or elementary residence nucleus, which aggregates a set of basic necessities, such as kindergarten, the business of daily shops, elementary green core and area for children's game. Its size in terms of inhabitants has values ranging from about 2,000 to over 5,000, and in spatial terms, is similar to a circular area of

[10] Source Mayhew in Clementi (1983:124).

[11] All the manuals produced since the 30s, still playing an important role in the professional practice, are based on this theoretical approach.

300 meters of radius, which corresponds to the maximum influence radius intended for the facilities in the unit;

b) aggregation of multiple dwelling units is defined as a second level of the *district*, with an average population of the order of 15,000 inhabitants, with specific services such as primary and middle school, library and community centre, market, park, sports equipment and other small facilities;
c) the third level configures a *unit of settlement* in which, in addition to the residence and to services, there are all the basic urban functions: it coincides dimensionally with the cities of small and medium size, with about 50,000 inhabitants and, in the case of a big city, it can be compared to an urban area characterized by a potential managerial autonomy;
d) the fourth level is a *settlement system* articulated in urban units with different sizes and roles, distributed on the territory of a region. The nature of the functions, which must be installed, can be only identified on the basis of understanding the role that the city has with respect to the regional territory.

At this point, it is possible to represent both models of the functional city through a nuclear scheme, in which the service functions are concentrated spatially in central position with respect to the corresponding urban unit (Fig. 3.4), and the spatial configurations through the classic schemes of centripetal and linear organization, as well as the one with a reticular mesh (Fig. 3.5).

The planning applications of this model of functional city (e.g., the urban planning in Germany in the 20s and the researches of Le Corbusier and Hilberseimer) become much more complex than the above hierarchical relationships, and their disastrous outcomes have been the focus of an intense debate from which emerged concordant positions on the fact that the nuclear hierarchical scheme constitutes an unacceptable simplification of the overlapping values and the multiplicity of interests that characterize the urban phenomenon.

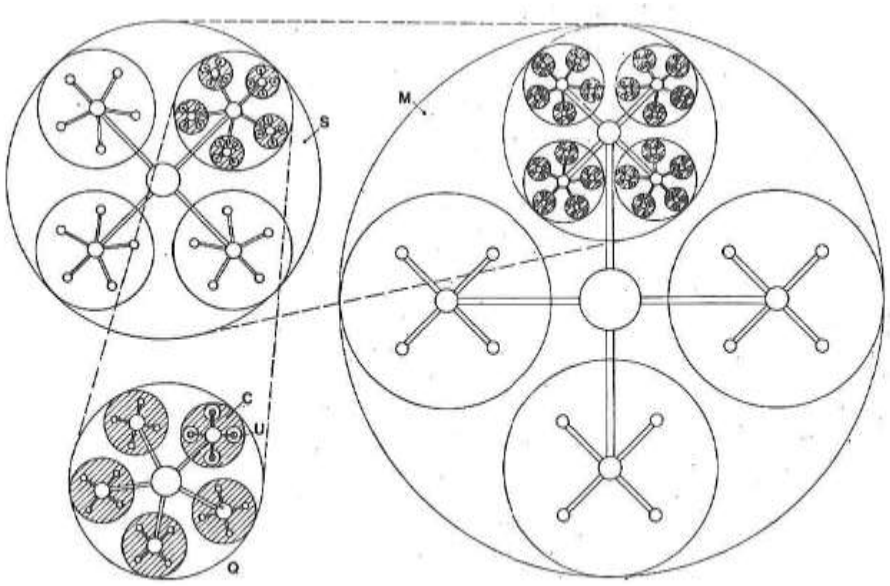


Figure 3.4 The nuclear city model[12]

As a consequence, there is the spread of the idea of favouring the division of the city into parts for the purpose of knowledge and of the definition of the transformation project, and their recognition and diversity become the values that the normalizing practice of functionalist urbanism does not enhance the design. In this way, the functional city model characterized by the coherence of the scalar and dimensional relationships between the various systems of activity and spaces is generally replaced by a model of city for parts, where the whole is not unified necessarily, and where it is more interesting to highlight the difference between the component parts than the homogeneity (Clementi, 1983). A model of the city in the city derives, which is realized for example in the urban renewal for Berlin proposed by Ungers et al. (1978): "The urban islands have an identity in keeping with their history, their social structure and their environmental characteristics. (...). The pluralistic project of the city in the city is essentially the antithesis of the current urban theory that begins with a definition of the city as a whole. This corresponds to the current structure of society, that increasingly unfolds more like a society made by an individuality of needs, desires and

[12] Source: Clementi (1983:126).

conceptions. The project also entails an individualization of the city and then a removal of the reference to types and standards".

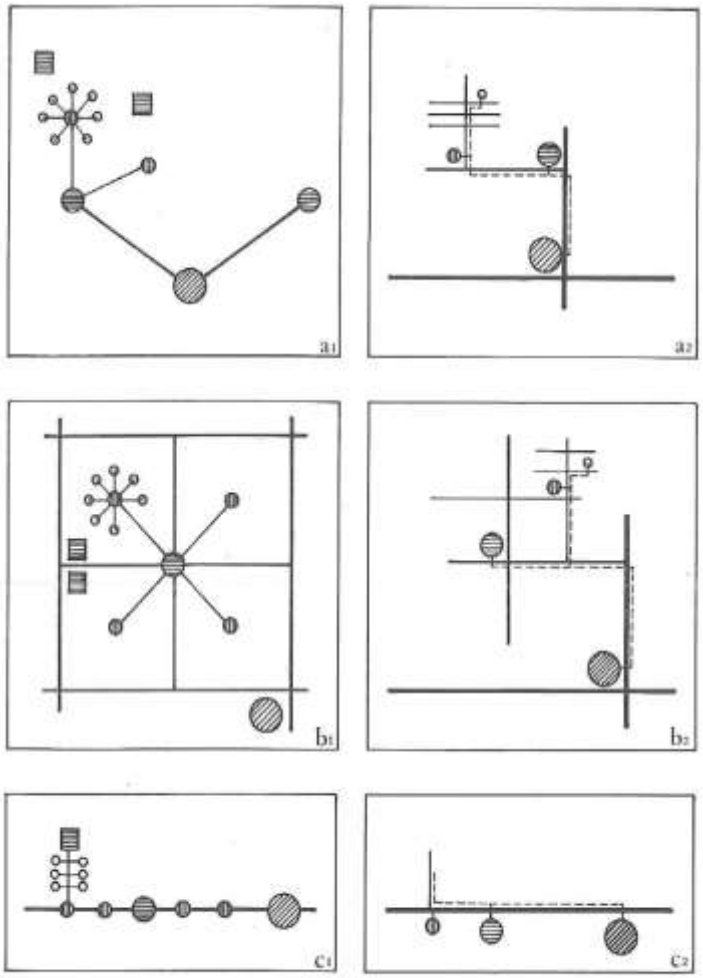


Figure 3.5 Structure and patterns of displacements in the knit (a1, a2), centripetal (b1, b2) and linear (c1, c2) organization[13]

Currently, in front of the new wave of transformations that the city is experiencing, a new model has emerged, which is not directed to the construction of new elements, but, above all, to the reconstruction of the existing ones. The idea is connected to a compact and dense "new city"

[13] Source Hutchinson in Clementi (1983:127).

(Cassetti, 2012), which has a sufficient critical mass to support a wide variety of activities and services, to reduce the large costs of transport, time and energy The new compositional pillars on which rests this idea can be traced basically to four: the functional intensification, the interconnection network, the reconstruction of the plot of public spaces, the reconnection of the key points in a spatial sequences system.
The framework that tends to emerge, therefore, is that of an urban system characterized by a highly interconnected identity through the communication channels and through the network of public services.

3.3 TECHNICAL CONTRIBUTIONS DERIVED BY MANUALS

Starting from the immediate post-war period until the end of the 50s, several manuals were written, aimed at solving problems related to professional practice, through the definition of technical solutions. Despite being fairly updated by the international urban culture of the time, in most cases these solutions were based on an idea of the city in which the capitalist relations of production predominated and where the urban land rent and the leading role of industrial localization were accepted as determinants of the urban system (Falco, 1977: 40).
The underlying idea in the manual edited by Piccinato (1947) is that each specific city must be designed in its entirety as a real living organism in continuous evolution. In the Piccinato's manual, there is the coexistence between the awareness of the limitations of a rigid and static approach, on the one hand, and a positive technical opinion on the Tedeschi's contribution, which can be a "more rigorous work tool for designing", on the other hand (Piccinato, 1947: 113). The essay, equated to a manual, entitled "The design of services in the urban settlements" by Tedeschi, published in 1947 in two of Metron editions, aims at "establishing, as much as possible, a precise and concrete connection between the size of the town and dimension of services" (Tedeschi, 1947: 55). He proposes a series of index-numbers to be put into relation with the birth rate and the average age of the population, or other equivalent data, obtaining immediately the transition "from a concept of a general statistical nature to an index affected by the formula to be applied", namely a set of standards relating to services which allow "the design of an urban aggregate sufficiently equipped by infrastructure and services". The

author examines the following services: education, cultural facilities and entertainment (libraries and performance halls), sport (sports fields, gyms, swimming pools, playgrounds), food rationing (butchers, supermarkets), health and care (hospitals, emergency room, outpatient clinics), security (firefighters), administrative and financial structures (municipal offices, post offices, banks), mortuary equipment (cemeteries). So, starting from numerical data and mathematical criteria, he groups the services into five categories according to a different combination of the utilization coefficient (K), the economic functional size of the implant (d) and radius of action (D). For each service category, he provides the formulas for proportioning, achieving the definition of the quantity and location of the services, their radius of influence and the building density of the areas served by each service.
In line with the Piccinato's manual, also Rigotti (1952), in the second volume of "Urbanistica, la Composizione", takes the view that the basis of the proportions are represented by social actors and organizations, which are integrated depending on the place and time to all other individual or collective factors, which characterize a settlement and are defined by a given radius of influence that involves the factors of distance and time. For that reason, the proportioning is divided into proportioning the areas and the distances. Proportioning the areas establishes the areas for the essential functions in an urban settlement. This is an operation linked to factors of collective and social character, which leads hardly to establish unitary or percentages areas and fixed and always usable rules. For most data, Rigotti suggests the reference to the ratio between the total number of persons, intended as the sum of single abstract entities, and the density for each hectare of the area (i.e. sq.m/ inh.). By proportioning the distances, the areas given over to different functions are laid in a calculated ratio, and it is possible to measure the distance of the various surfaces between the different elements. For the dimensioning of the services, Rigotti also refers to the study by Tedeschi, and provides general guidelines for the proper location of residences, schools, churches, hospitals, playgrounds and roads, by engaging the mutual relations with other aspects such as the population density, the travel radius and the travel times.
In his manual, Dodi (1945) provides a quick reference and historical reconstruction of the most advanced countries in terms of cultures and disciplinary practice. In particular, with regard to public use buildings, Dodi (1945: 8) emphasizes that "from an urban point of view, it is not

easy to give precise rules about the distribution, the characteristics and the areas of public buildings in relation to the size of the urban aggregate and the number of inhabitants". Therefore, the manual provides a guideline, in part oriented by the experiences of other European countries.

One of the most important tools of professional practice during the years of reconstruction was the "Manuale dell'Architetto" by National Centre for Research (CNR). In the manual of 1962, the part relating to town planning assumes its own autonomy, with an entire section dedicated to the general planning rules. However, it contains the persistence of the attitude of abstraction found in the previous editions in the definition of functions, quantity and characteristics of the services. The proposed methodology for the dimensioning of residences and services is summarized in several tables, which were judged exhaustive of the useful data for the general and analytical dimensioning of the individual elements that compose the plan. Moreover, these tables refer to parameters such as density of population and dwelling density (or manufacturability index), both referred to the entire territorial area or the area of the lot.

All the post-war manuals deal with the matter of standards with different levels of detail. There are no limits, almost never, to define only the sq. m of the lot area of each item of equipment to be allocated per each inhabitant, but there is also the indication of the internal organization of the lot, although it must be highlighted the lack of interest in the aspects of management and response to the needs of the population. There is the substantial absence of the reference to any social and political problems, against a fair examination of the technical aspects.

In manuals related to the engineering culture, instead, there is the prevalence of the deterministic approach based on socio-economic surveys and parameters that define the amount of areas per capita, the functional dimension of the area and the radius of influence of the services according to more precise calculations and formulas (some examples are reported in Table 3.1).

Also with regard to the techniques and methods of designing the city, there is the consolidation of the use of the homogeneous zones introduced by DI no.1444/1968, which reinforces the conception of urban design based on rigid mono-functionality of the parties. Also Fucella (1984) organizes the city into two major subsystems: a subsystem of activity-settlements that includes the homogeneous zones, and

another subsystem of connections-channels related to the movement of goods and people (highways, roads and railways), to the technological infrastructure (aqueducts, sewers and electricity network) and to the information system (telephone network and telegraph).

Table 3.1 Dimensioning parameters extrapolated from technical manuals for some services[14]

service		education and training	public interest	green	mobility
type		I cicle	religious	equipped for community	urban
facility		primary school	church	playing field (3) [b]	car park
urban standard by law [sq.m/ inh.]		2,50	0,70	1,00	2,50
technical urban standard [sq.m/ inh.]	a_{min}	0,90	0,70	1,00	3,00
	a_{max}	2,50	1,50	1,25	5,00
land area per user [sq.m/ u.]	q_{min}	15,00	1,00	15,0	-
	q_{max}	23,00	-	30,0	-
Slp per user [sq.m/ u.]	p_{min}	-	0,75[a]	-	-
	p_{max}	-	1,00	-	-
Slp [sq.m]	Slp_{min}	900	-	-	-
	Slp_{max}	4.720	-	-	-
Area di relevance [sq.m]	Ap_{min}	3.000	600	(Sf) 1.500	-
	Ap_{max}	13.800	10.000	(Sf) 12.500	-
planning level		municipal	municipal	-	-
age classes [years]		6 - 10	tutte	11 - 14	-
served population [no. inh.]	P_{min}	1.000	1.000	1.200	10.000
	P_{med}	3.000	5.000	10.800	-
	P_{max}	6.000	20.000	15.800	> 200.000
served users [no. inh.]	U_{min}	75	1.000	25	-
	U_{med}	625	12.000	500	-
	U_{max}	800	20.000	-	-
maximum travel time with a means of transport [min.]		15	15	-	-
radius of infuence [m]	Ri_{min} for density equal to 200 inh./ha	350	400	500 or 1.000 if bicycle	-
	Ri_{max} for density equal to 100 inh./ha	800	560	1.000	-
access mode		pedestrian / bicycle / school bus	pedestrian / vehicular / public transport	pedestrian / bicycle/ vehicular / public transport	-
car parks of relevance [sq. m]	App_{min}	270	-	-	-
	App_{max}	1.416	-	-	-
other services provided by equipments		-	no	-	-
contemporaneity rate (tc=Uc/U t_c)		1,0	0,6 - 1,0	0,25 ÷ 0,50	-
management		-	-	-	-

[a] per seat

[b] playing field for children under 14 years of age with a gym, laboratories and a specialized community center

The manual "Tecnica Urbanistica" by Mercandino (2001) proposes a systematization of the material, starting from four key concepts for proper land management: surveys, screenings, diagnosis and project. The work, with an extremely operative approach, examines all relevant information required for proper urban planning, articulating them according to a systematic breakdown. The manual also provides guidance for localization of plants and services, especially as regards the suitability of the area, the recommended combinations and accessibility by the population (radius of action): these are useful criteria which, however, do not seem related to the availability of resources and their ability to support additional loads.

[14] Author's elaboration.

In the completely new manual by Zevi (2003), there is the focus on the theme of landscape planning, of the constraints and the consumption of land with ecological standards designed to reduce the permeable spaces. However, the author does not differ from the traditional approach based on functional zoning introduced by DI 1444/1968.
Even today, the manuals are an important reference tool for many professionals working in the urban field and in need of a unitary framework of the procedures and techniques to support the planning tools (Tab. 3.2).

Table 3.2 Urban facilities in the manuals[15]

#	*tecnical manual*			*urban design*	*location criteria*				
	year	*author*	*title*	*method of calculation* [a]	*ri*	*ZO*[b]	*accessibility*	*connection or integration with other services*	*practical indications of design*
1	1947	L. Piccinato	Urbanistica	$Ni = K \cdot A/d$, $Ni = A/D \cdot Si$	-	-	-	X	X
2	1952	G. Rigotti	Urbanistica - La composizione	$Ni = k \cdot A/S$, $Ni = A/\pi D \cdot ri^2$	X	-	-	-	-
3	1953	L. Dodi	Elementi di urbanistica	$Ni = K \cdot A/d$	X	-	X	X	X
4	1962	CNR	Manuale dell'Architetto	$Ss = A \cdot ds$	-	X	-	-	X
5	1978	C. Carozzi, G. Longhi, R. Rozzi	Popolazione suolo e abitazione	ds = f(d), $Ni = K \cdot Na/d$	-	-	-	-	-
6	1984	R. Fucella	Note di tecnica urbanistica	$ds = \sum S/[(Sl^k \cdot Df^i)/(80 \div 100) + (V \pm \Delta V)/(80 \div 100)]$	-	X	-	-	-
7	2000	A. Cuzzer	Fondamenti analitici dell'urbanistica moderna	D.I.1444/68: Ss = f(d)	-	X	-	-	-
8	2001	A. Mercandino	Urbanistica Tecnica	$Ss = \%S$, $Ss = \sum Slp^m$	X	X	X	X	X
9	2003	L. Zevi	Il nuovissimo manuale dell'Architetto	Ss = Ads	X	X	X	-	X

[a] Ni= number of services (Tedeschi, 1947); k= coefficient di utilization; A= no. of users, no. of students, no. of bedrooms, no. of employees; d= dimensional and functional parameters; D= population density; Si= area of influence of the service; S= lot area ; ri= radius of influence; ds= services' endowment; Ss= area for urban standard; Sl= free areas; Df= land density; V= volume of the services; Slp= superficie lorda di pavimento

[b] ZO= homogeneous zones

3.4 OPERATIONAL CRITERIA OF LOCATION AND DIMENSIONING

"The review of the manuals shows that the proposed activities and research on the services was characterized by the absence of interest in the economic mechanisms of production of services, as well as the management and response to emerging needs of the population. In substance, there is the lack of all social and political problems, against a fair examination of the technical aspects" (Falco, 1987). In the service planning process, it is important to carry out the integrated analysis, in relation to the demand in order to define the priorities, the supply, for its improvement or enhancement considering the managerial aspects, and

[15] Author's elaboration.

the urban structure, that is necessary for the configuration of services. The integration mode must be defined in relation to the specific circumstances of the intervention context, avoiding the use of preformed solutions that can be used anywhere.
Clementi (1983) identifies six operational aspects that must be considered in the planning stage:

- the ratio of the considered urban module and the other urban modules. Regardless of the scale, several design solutions can be configured: the self-sufficiency of the single units (Fig. 3.6a), the imbalance through a push specialization (Fig. 3.6b), or, preferably, an intermediate situation, characterized by the dominance of a specific service function combined with other supplementary functions (Fig. 3.6c). These solutions, in turn, depend on the characteristics of the unit that is being evaluated, such as the degree of physical accessibility and the degree of centrality. The combinations of the services must be articulated by making recognizable the horizontal differences with the other units having a homogeneous functional level, as well as the vertical ones with other sets of the higher functional level.

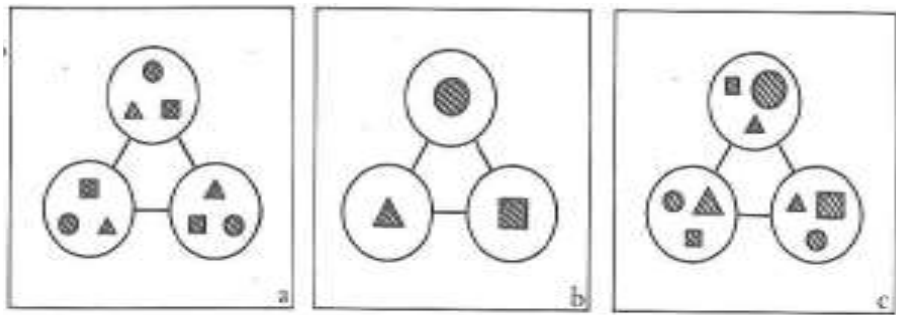


Figure 3.6 Configured design solutions[16]

- the spatial distribution of services within the considered module. Two situations can be configured: a spatial concentration of different functions or a spread network of specialized service units (mono-functional units or with multiple functions), each programmed to complement and be complemented by other service units located within a defined distance. While the concentration of services enhances the potential of a place destined to become the centrepiece

[16] Source: Clementi (1983:133).

of the entire community, the second solution highlights the integrative function of services between the different areas. Consequently, the location models, basically single-centred, will be applied in unstructured areas with scarce resources in order to stimulate the development of central places. Instead, in the settlements more permeated by the collective use of space, there will be the application of hierarchical diffusion models. The spatial distribution, moreover, is connected also to the analysis of the possible topological relationships between the services and the urban module, that allows the location of all the services: internally to the module, for a supply of services oriented mainly to consumption within the area, concentrated along the border, in order to stimulate the interconnection relations with neighbouring areas, or external to the module, even though it is functionally linked to it (Fig. 3.7).
Combining the evaluations on the road conditions and transport system with those on the nature of the equipment to be realized, it is possible to identify the most appropriate alternative locations with respect to the structure of the considered area and the objectives hired to meet the demand.

- the choice of the functions to be combined, through systematic methodologies of functional combinations to be realized in the city. The qualitative analysis on the type of affinity relation, indifference, or incompatibility that is established between the service categories lead to distinguishing more or less inductive or repulsive elements, and, subsequently, to build hierarchical classification schemes that, in general, define the equipment which have structuring capabilities and the possible level where they play such a role (Fig. 3.8);
  However, since the abstract models of cluster aggregation are defined on the basis of technical assessments of demand and supply, their limits can be highlighted during their application. Indeed they are not contextualized and come into the crisis in favour of multifunctional combinations, which are defined time to time in the bargaining with the service management organizations;

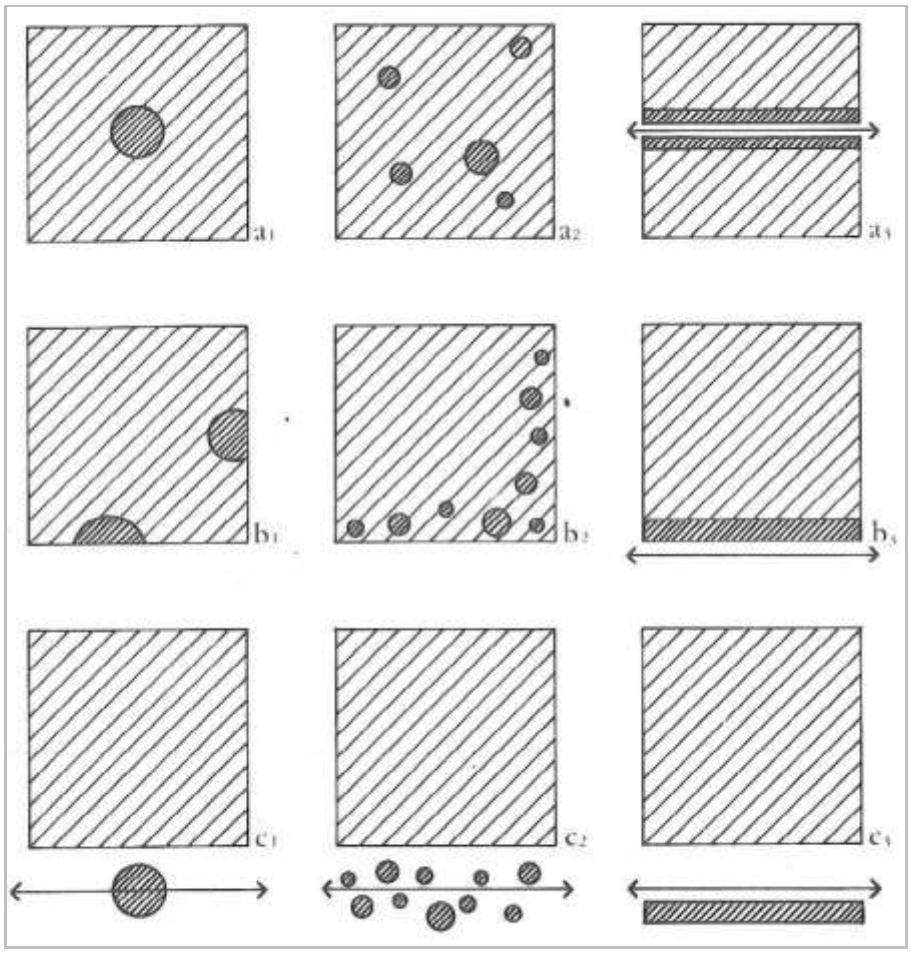


Figure 3.7 Abacus of topological relationships between services and urban surroundings[17]

- the convertibility of the service. The obsolescence of the service depends on several factors: the evolution of needs, induced by demographic processes or changes in lifestyle, the institutional transformations, the way to provide the services and the deterioration of the building structures. The gradual implementation of services and their upgrade over time allows the adaptation of the supply more easily to changes in demand. When it is not possible to predict the demand dynamics with sufficient margins of certainty, the alternatives

[17] Source: Clementi (1983:137).

become: the programming of achieved supply levels , paying a period of under-utilization, or an offer of reduced size still able to exert its functions, with the foresight to reserve an adequate share of areas for the future development of services;

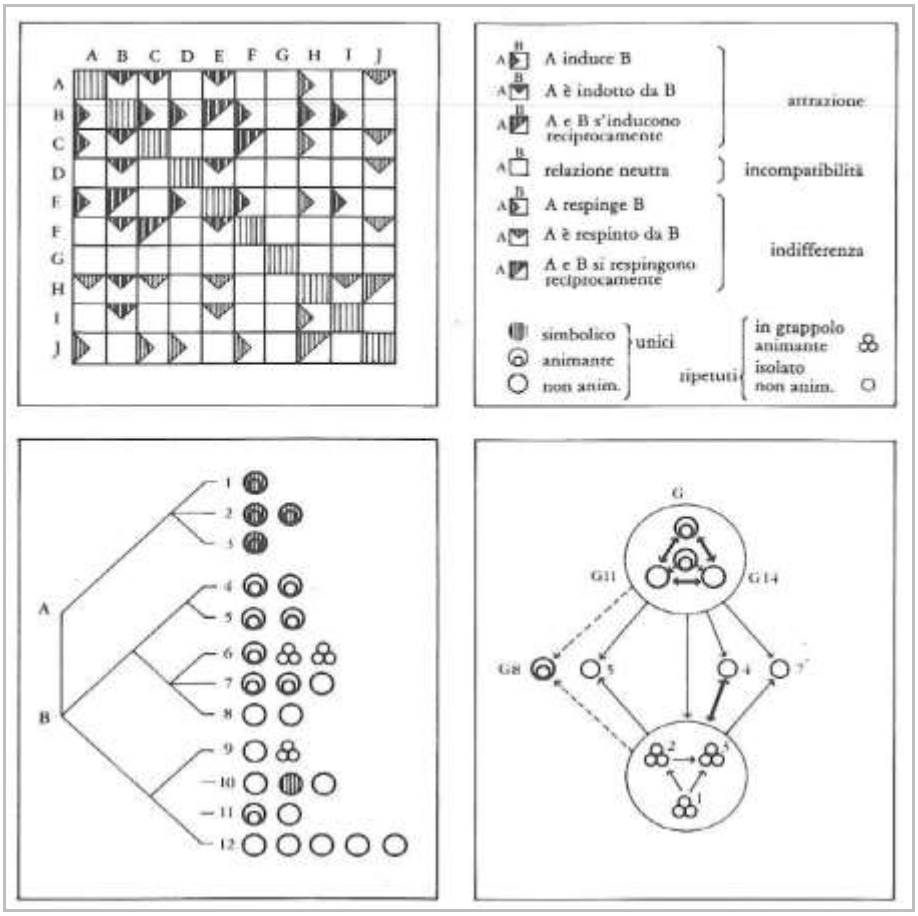


Figure 3.8 Capability of structuring of services[18]

- the identity of places and facilities. Experience shows that the equipment produced under the several government programs (for example the program for kindergartens, for postal buildings, for swimming pools, for libraries and for multi-purpose cultural centres),

[18] Source: Clementi (1983:138).

often according to industrialized processes made possible by a lot of units to be realized, rarely have achieved qualitatively satisfactory results, and, especially, even more rarely, have achieved the objective of reducing costs. In the perspective that it is possible to return a decisive role at the initiative of the local government systems, it is necessary to find a balanced relationship between the needs of types and series of services with those related to morphological and functional peculiarities of the specific contexts of intervention. Moreover, the uniqueness of the design solutions should be related both to location and dimensioning requirements for the equipment, and to its internal operating features, completely separating the treatment of the formal types from the functional ones;

- the fulfilment of the previous and future needs, not only through the traditional process of defining types that leads to respond to the needs through the production of physical facilities but, also, through the de-normalization, that is the process of organization of the supply that employs a set of performance, even outside of specialized equipment. The measures to be taken in this regard are: the temporary or cyclical use of urban spaces normally engaged in other functions, the improvement of the conditions of use of the equipment (home performance or other places of access to users), the extension of the access to users carrying demand similar to the one that is satisfied institutionally by the service, and the partial or total reorganization of the equipment in the relation to the evolution of the needs.

The experience of the manuals, moreover, allows the definition of the list of some quantitative elements for the design that have to be placed in connection with the urban image that is intended to accomplish. In fact, they provide the minimum indications for the functioning of each service and express the levels of relationship between different types of service (Falco, 1993):

- the *functional and economic dimension of the service*; usually it is expressed through the quantities of users of the service and is determined by considerations of the effectiveness of the service or by economic considerations (which take any economies of scale into account);
- the *gross minimum size of needed land*; it is expressed in the amount of area and is a function of the functional size of the service, the expected urban type and the ratio of predetermined covered and uncovered area;

- the *ratio between the covered and uncovered area*; depending on the urban and building type, the context, in which the service is inserted, must be taken into account, possibly assuming additions in the use of open spaces and covered spaces;
- the *radius of influence of the service*; it is expressed in meters or in travel times with various access systems (on foot and by public transport). It is a function of the density of population per unit of area (and thus of urban typologies), the functional size of the service, and above all of the ways of displacement.

3.5 CHAPTER SUMMARY

At the beginning of the path of the literature review on urban standards, chapter three has focused on two issue mainly: urban organization's theories and approaches of technical manuals to the solution of problem connected with the professional practice. Firstly, the quantity and quality of community facilities can determine the modes and the size of intervention in the urban areas. Since the connections of the services with various disciplines, their organization has been studied in the economic and geographical field, as well as in urban planning. Secondly, from the study of the technical manuals, it is possible to deduce the prevalence of the deterministic approach based on socio-economic surveys and parameters that define the amount of areas per capita, the functional dimension of the areas and the radius of influence of the services, according to precise calculations and formulas. Both this aspects are useful for informing the later design of the empirical study and the future development of the model of this research.
In order to continue the analysis carefully, it is necessary to focus on the normative aspects, which regulate currently the planning of services. Consequently, the next step is characterized by the investigation of the legislations at different levels: starting from the Italian national laws and the regional rules to the international legislative approach. This investigation will be more fully treated in chapter four.

4 NORMATIVE CONTRIBUTIONS TO THE PLANNING OF SERVICES

> "Modern urban man is born in a publicly-financed hospital, receives his education in a publicly-supported school and university, spends a good part of his life travelling on publicly-built transportation facilities, communicates through the post office or the quasi-public telephone system, drinks his public water, disposes of his garbage through the public removal system, reads his public library books, picnics in his public parks, is protected by his public police, fire, and health systems; eventually he dies, again in a hospital, and may even be buried in a public cemetery. Ideological conservatives notwithstanding, his everyday life is inextricably bound up with governmental decisions on these and numerous other local public services".
>
> (Teitz, 1968: 36).

The public service, supporting and completing the residential space, is subject to the introduction of, also social, rules of analysis and proportioning, of the territory (Piccinato, 1947), that means to establish a measurable correlation between (wider) needs of the community and (unique and synthetic) design of the territory. The social and common rules of good living, in fact, might be translated into physical values, i.e. in right measures and normal endowments for each inhabitant. Furthermore, the definition of rules on the optimal urban density, the distance between the objects of the city, the size of housing and functional and typological distinction of urban elements, are a direct consequence of the need to identify a system of elements which must be defined formally and functionally. Consequently, the number and quality

of the works of urbanization[19] (Public Utilities and Community Services and Facilities), which are present in a municipal territory, can define the level of urbanization and, in addition, it becomes an indicator of urban quality (Mercandino, 2001).
This chapter examines the main features of urban standards that the regional, national and international legislations take into account.
Moreover, it focuses on the transition from a quantitative to a qualitative definition of urban standards, highlighting the importance of the inter-municipal cooperation. Figure 4.1 shows the articulation of the chapter.

Figure 4.1 Chapter 4 diagram

[19] In Italy, the works of urbanization are defined by L. no. 847/1964 and by the previous L. no. 167/1962, which introduced the plans of zone for affordable and popular housing, as "The set of external works which make accessible and usable a building for residential or productive activity are called works of urbanization. These works are divided into primary infrastructural works, in direct service of the buildings, and secondary infrastructural works, at the service of social life that takes place there".

4.1 BACKGROUND CONTEXT

Born with the arduous task of regulating the use of space by indicating the optimal measures and even taking charge of raising the quality of residential areas in terms of social and democratic growth, the urban standards appear, to all intents and purposes, the products of the need of constructing a shared model of a minimum quantity of qualitative endowments, able to satisfy primary and basic needs (green spaces, education, assistance) and linked to a particular idea of a quantifiable and measurable urban quality. These urban standards are initially borrowed from the existing standards for the design of the houses and applied to the field of urban planning. If the housing standards can be understood as the "element or a set of elements, possibly parametrized, characterizing a given functional status, of qualitative and dimensional type, of a housing complex" (Borri, 1985) and therefore they include the building standards of the components of housing and buildings, the urban standards, which represents the endowment of areas and public facilities or for public use, seem to be a consequence of the first. Consequently, they derive from the need to resize the residential area, depending on its request for services, in order to come to the creation of self-sufficient neighbourhoods, according to the model of the Anglo-Saxon and North American experience of the neighbourhood unit. The direct consequence is the formulation of planning regulations, that must be objective and regulatory of the city and that, reaffirming the democratic use of space, are able to establish certain organizational criteria.

When the concept of standards makes its official entry into the Italian legislation with the DI 1444, on 2 April 1968, the problem of the definition of the characteristics and quantity of areas for services finds the urban culture substantially unprepared. While the post-war reconstruction took place in the rest of Europe by practicing, often, more careful design solutions to residents' social needs (for example, the integrated neighbourhoods built in Germany through Siedlungen or the experience of the New Towns in Britain), in Italy, instead, it is controlled only through the compulsory compliance with certain numerical relationships in the design of new urban instruments, so that the standard is configured as a protective measure compared to uncontrolled urbanization of the territory.

In addiction, the debate is also conducted on the same interpretation that must be given to the concept of standards, beyond on the definition of indices and parameters, and the value that must be assigned to them. In opposition to a "quantitative and legislative" interpretation which the Ponte Law established, there is the more "dynamic" one (Salzano, 1999: 139), according to which the standard "cannot be considered an established one-off measure, equally valid today as in the next ten years", but it must be dynamically retouched according to the emerging needs. By a famous definition of Tutino (1965, cited by Salzano, 1999), the standard "must be a flag (symbol) that must be renewed at each milestone, so that it can retain its value".
After almost fifty years, the issues of standards are not only unresolved but, also, increased in numbers: the application methods, the users' calculation criteria, the procedure of acquisition of the necessary areas, the finding of the financial resources to move from planning to the implementation and management of the infrastructure. Also if referring to the cramped and unsatisfying Inter-ministerial Decree no. 1444/1968 (DI), it is, at least, urgent and necessary to assess what equipment can be compatible with the economic reality of Municipalities and with the many and varied economic interests that are involved, and, moreover, to revisit the concept of quantitative standards, contained in that DI.
Today, there is the birth of the conception of qualitative standards as an alternative, or rather, as a complement of the urban standards defined by the law (Falco, 1987), which have governed until now and continue to govern the organization and construction of the urban areas.

4.2 ITALIAN LEGISLATION

Although the term appears for the first time in the Italian law in article 8 of L. no. 47/1985[20], the concept of urban standards is known in Italy in early fifties, within different theoretical elaborations of specialized culture[21] and the sectoral normative activities[22], and finds its first

[20] The law does not specify a meaning of the term, but simply refers to the DI 1444/1968: "Mutation of the intended use that involves variation of the standards set forth by the Inter-Ministerial Decree, 2 April, 1968" (L. 47/85, Art. 8).
[21] Look at Chapter 3 - 3.3 Technical contributions derived by manuals.
[22] - C.M. 4555/1963, on: endowment for public services, in relation to the dimensions of neighbours; endowment of public green areas, in relation to the numbers of inhabitants;

application in the planning practice at the beginning of the sixties (Fig. 4.2), especially in the popular districts of Ina-Casa (and then Gescal) [23], and in the urban plans of Rome, Turin, Modena, which really experience the definition of amount of areas to be preserved for public spaces (Falco, 1993).

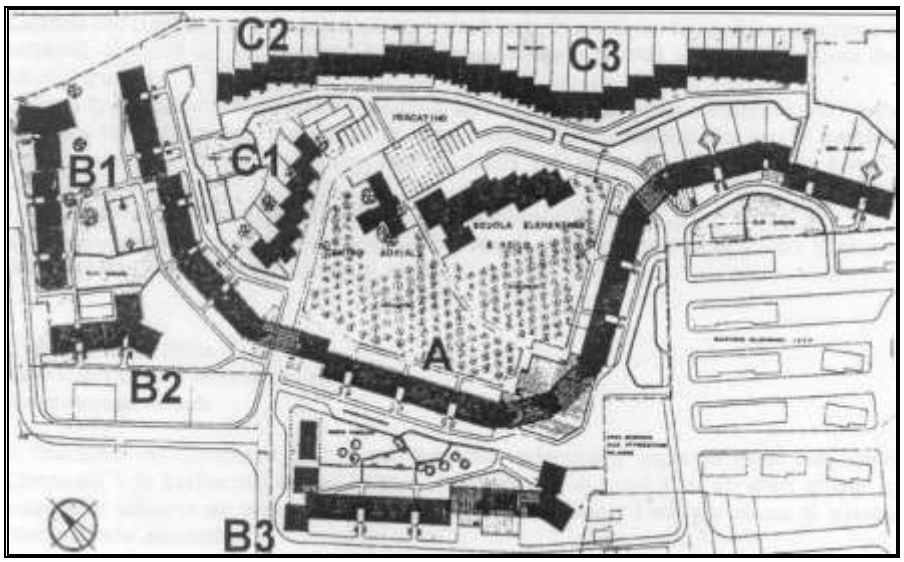


Figure 4.2 Bruno Zevi, INA CASA District, Pastena, Salerno, 1955/61

But later, when, being got stuck the debate on urban reform, several disasters, such as the Agrigento's landslide in July 1966, caused by an enormous load of buildings, and the serious flooding in the Veneto region and in Florence, bring back dramatically the urban issue to the

- C.M. 3930/1964, that deals with: educational facilities in the urban plans; minimum and maximum endowment (sq.m/inh.) for the different levels of education: nursery, kindergarten, primary school, secondary school, high school.; quantitative measures about: no. of students per building, maximum walking distance [m], maximum distance from a public transport [minutes], minimum area [sq.m/student], minimum total area [sq.m];
- C.M. 425/1967, which gives indication about: residential facilities, endowments [sq.m/inh.] for different types of public facilities (religious, cultural, social, for assistance, healthcare, administrative); endowments [sq.m/inh.] for different types of green areas (elementary green core, green areas for children from 3 to 6 years old, green areas for children from 6 to 11 years old, green areas for children from 11 to 14 years old, green park for the neighbours, urban green park).

[23] The activities of the INA-Casa assumed a self-sufficient neighbourhood of the most basic social services, while after the Gescal broadens the regulatory apparatus through a residence model integrated to the service system.

fore. As a consequence, the "Ponte" law (L. no.765/1967) was issued with great urgency, on 6 August 1968. Article 17 of this law makes reference to the urban standards. These standards, prescribed by law, are defined technically and operationally in a ministerial decree issued one year later: the Inter-ministerial Decree no. 1444, on April 4, 1968. Its formulation is derived from a wide meeting-debate between the political, cultural and business forces (Odorisio, 1999), including:

- a group of urban planners of confidence of the Ministry, who were asked to ensure an outcome that would represent a quantum leap in the planning process,
- the Ance[24], which were required to ensure an outcome that would not cause traumatic consequences for the business and economic world,
- the representatives of local authorities and big towns, who were concerned about the impact with the economic realities, so they demanded greater autonomy in the choices and wished that the national standards would have represented a protective shield against the pressure received locally.

In the end, with a delay of decades compared to other European countries, by using the theoretical elaborations by Ghio and Calzolari (1961) and the analytical studies by the Gescal Studies Centre (1964), as supplemented by DI no. 1404/1968[25], the national legislation on urban standards was technically defined (Falco, 1977).

The DI 1444 is based on two assumptions deemed valid: all urban services must be provided by the local authorities, especially by the City Council, and for each service it is necessary to set a minimum ratio with reference to a settlement size: the breadth of the territorial scope or the size of the population to be served. It provides standards for two different types of equipment (art. 3, 4, 5, 6): those of "local interest" (schools, facilities for public interest, public and equipped green park and car parking), that must be directly accessible by users with walking trails or at least achievable in the short time frames (no more than 20-25 minutes); and other of "general interest" or "territorial standards" (higher education, hospitals and urban and regional parks), which, by their nature or the required functional size, must be located in relation to wider catchment areas. Moreover, the standard for the facilities of local

[24] National Association of Builders.

[25] The D.I. 1404/1968 governs the "minimum distances to the protection of road tape, to be observed in the building outside of urban centres", in relation to the classification of roads.

interest are evaluated differently, depending on where they fall, for example in residential areas or in the productive and commercial areas, and then in relation to different homogeneous zones in which the municipal territory can be organized (Tab. 4.1).

Table 4.1 Minimum urban standards for the different homogeneous areas complemented by the provisions of art. 18 of Law 765/1967.

URBAN STANDARDS						
Zone	FEATURES OF THE ZONES (According to article 17, Law 6 Agust 1967, no. 765)	Obligatory minimum endowment per capita in square meters [sq.m/inh.], excluding roads' spaces				
		pre school assistance, compulsory education	facilities of common interest	equipped green (1)	public car parks	Total
A	Existing tissue, with the old, artistic and environmental character, including sorrounding zones	4.5	2.00	9.00	2,50 + 4	(2) 18 + 4
B	That is built in whole or in part, different from A. (It is considered partially built if the covered area ≥ 12.5%, with spatial density ≥ 1.5 m³ / m²)	4.5	2.00	9.00	2,50 + 4	(2) (3) 18 + 4
C	Areas which are not built, for the new complexes, or built partially	4.5	2.00	9.00	2,50 + 4	18 + 4
	Ditto, for contiguous areas to environmental, artistic and archaeological pre-existing tissue	4.5	2.00	15.00	2,50 + 4	24 + 4
	Ditto, for municipalities with an expected population less than 10,000 inh.	4.00	2.00	4.00	2 + 4	12 + 4
D	New industrial facilities and similar		10% of the entire area of the zone			10%
E	For agricultural use	6.00				6
F	Facilities of general interest	(4) compulsory high education 1.50	medical equipment and hospitals 1.00	urban and regional parks 15.00		17.5
	Shopping centers and office's areas	endowment in sq.m per 100 sq.m of gross floor area of the designed buildings				
				80		*80 + 16*
				≥ *40 + 16*	min 40	

Notes:
(1) Excluding buffer zones along the roads.
(2) The public areas of the new destination in zones A and B are worth double.
(3) In case of impossibility, it is possible to find the spaces in the vicinity.
(4) Excluding Universities.

The quantity theory for local facilities at the base of the decree can be represented as follows:

- for residential areas, the area per standard is defined by:

$$Sst = dst \bullet N_{inh.} \qquad [m^2] \qquad [4.1]$$

where *dst* is the total standard per capita, which is divided as follows:

$$dst = dst_c + dst_i + dst_v + dst_p \qquad [m^2/inh.] \qquad [4.2]$$

with:

dst_c = standard endowment for facilities of *common interest,*
dst_i = standard endowment for facilities for *education,*
dst_v = standard endowment for *equipped green parks,*
dst_p = standard endowment for *car parks*;

- for productive areas, the urban standards are calculated on the basis of a percentage (k^p) of the territorial area (St) of the zone:

$$Sst = k^p \bullet St \qquad [m^2] \qquad [4.3]$$

This quantity can be apportioned among green spaces, public parks and facilities of public interest;

- for business and commercial areas, the standards can be calculated according to a percentage (k^{dc}) of gross floor area (Slp) of the buildings:

$$Sst = k^{dc} \bullet Slp \qquad [m^2] \qquad [4.4]$$

This quantity is divided between green spaces and public parking.

In addition, the areas to be allocated to urban standards are defined in terms of so-called "theoretical inhabitants", i.e. those calculated in relation to the existing volumes and in the expectations of the Urban Plan (through the conventional parameter which gives 80 or 100 cubic meters of standard volume to each theoretical inhabitant), rather than of resident people, who actually could use the services.

The DI no.1444/1968 clearly reflects the usage processes of the areas, while it loses sight of the problems with a thorough and complete management of the entire services sector, and especially the cost for the installation and operation of equipment. In the generation of the plans of the 70s, the emphasis on the importance of planning of urban standards can be observed, but, erroneously, there is the spread of the idea that a good plan is one that offers the highest amount of areas able to house the collective uses, regardless of the real capacity of the Public Administration to put into operation the equipment network. The judgement on the quantity tends to replace that on quality, i.e. the ways in which the interventions can be located and the system of collective spaces can innervate an alternative design of the city and territory. However, the more the application of the standard-norm was increased, the more the cost of the city increased, and this is the cause of the need

to ask the direct competition of individuals to bear obligatorily the local infrastructure costs, with the Bucalossi Law (L. no.10/1977).
At the end of the eighties, there was an awareness that the urban standards are unworkable because they are based on theoretical assumptions far from reality: in addition to being too rigid, they ignore the territorial diversity and, especially, the motivations and needs brought by the supervening deep mutations of social context. Even if, in a particular historical period, they have had the merit of having insured a substantial reserve of areas that otherwise would have returned in the reconstruction cycle, they have been improperly used, since they have sometimes limited the freedom in design. Moreover, technically, the homogeneous territorial areas, on which is based all the sizing of standards, are almost always uneven and they do not coincide with the consolidated areas and transformation areas of the plan. So, in the transition from the law to the practice, there have been simplifications, stiffening and distortions.
Today, according to the reflection on possible new and more sophisticated standards, it is necessary to remember that most of the urban planning is based precisely on the standard. In fact, they represent the exclusive measure of the design of the urban plan and its functional verification.
The several attempts to redefine a more current planning law were useless. The most recent Designed Bill, by the Working Group "Urban Renewal" on "Principles of territorial public policy and urban transformation" (2014), seeks to overcome, in Article 6, the limitation of the standards of 1968, which do not cover the whole scope of services needed and requested by the territorial system There is not the definition of a tool, but only the various service categories, postponing to a later stage, in a Joint Conference, the question of determining the quantitative and qualitative levels of individual facilities, through the identification of technical criteria and economic parameters. In conclusion, it is important to underline that the planning of services must be carried out by analysis of the context, which must be directed to the definition of prior and future needs, of usability and accessibility to services, to the relationship between equipment and site, to the opportunity to diversify the same facilities in respect of various demographic and social situations.

4.3 THE LEGISLATION ON THE STANDARDS IN THE REGIONAL LAWS

The use of regulatory standards has been the traditional shortcut to impose a control to phenomena of which were known few problems. In fact, the studies on the real behaviour of all the agents involved in urban processes were underdeveloped, the knowledge on how they interact with the demand and the supply of service activities were schematic, the checks on the effects of public policies did not exist. Only in recent times, the need for a more careful attitude to this type of problems has emerged. There is no wonder whether the Regions, which were later involved in the task of updating the standards, limited their actions to confirm substantially the previous amount, usually aiming to slightly raise the minimum values. Consequently, in such way, it was lost the opportunity to question the nature and the role of standards in the process of plan management. It was clear the necessity to overcome the perspective of restriction of a minimum amount that must be ensured in the design of the plan, in favour of new indicators that would have allowed a better assessment of the average levels of performance concretely prosecuted in different parts of the territory.
In legislative matters, the reforms, undertaken in the mid-70s[26] and further strengthened in 2001 with the amendment of Art. 117 of the Italian Constitution, define the territorial government as a matter of "concurrent legislation", according to which the State is responsible for the determination of the fundamental principles, while Regions have to legislate about the discipline of detail. The change of title V of the Italian Constitution introduced some important innovations, such as: the definitive overcoming of the urban adjective , considered increasingly reductive, in favour of a broader concept of the territorial government, the further strengthening of the autonomy of the local communities, by entrusting a leading role to Municipalities in managing the development of their territory and the maintenance of the coordination function by the Regional Administration.
According to these changes, as defined by the Minister Lupi in the recent Designed Bill by the Working Group "Urban Renewal" (2014), the Regions have the task of defining the "unitary territorial zones", within

[26] Dpr no. 616 of 1977 regulates "the transfer to the Regions of administrative matters within their competence".

of which it is possible to specify the basic regional endowments, the obligatory limits for building density, height, distance between buildings, as well as the maximum ratios between spaces for residential and productive settlements and essential territorial facilities.
The attention is also focused on the awareness to regulate the management of social services and assistance to persons, as well as the identification of areas or buildings necessary for the satisfaction of social housing needs.

4.3.1 The regulatory activities of the regions in the field

The accurate analysis of several Regional Planning Laws (*LUR*) emphasized the two different approaches to the urban standards (Fig. 4.3):

- quantitative: the endowment of areas to the standard per capita is different and variable among the Regions, and depends on the total number of inhabitants of the municipalities, their capacity of the settlement, the average rate of population growth over the last decade;
- qualitative: several *LURs* encourage the formation of the plan of municipal services, and deal with qualitative urban and environmental standards.

It is necessary to distinguish regions in which planning laws explicitly refer to Inter-ministerial Decree no. 1444 (Veneto, Tuscany, Marche, Puglia, Sicily, Sardinia, Prov. Aut. of Trento) from the ones that give their quantitative requirements (Piedmont, Lombardy, Veneto, Campania). Apart from any other consideration on the meaning of urban standards, the quantitative definitions by the Regions represent differences and similarities to the national legislation that, currently, are poorly justified. In fact, it is hard to comprehend their scientific sense compared to the national standards, which were the result of a negotiation between different parties during the period of formation of the decree (Falco, 1978; Odorisio, 1999). The Regions instead did not play any action of this nature.

List	Region	Law	relevant to DI 1444/68	quantitative approach	qualitative approach	Facilities Plan
1	Piedmont	Lr. no. 56/ 1977		X		
2	*Valle d'Aosta*	Lr no. 11/ 1998			X	
3	Lombardy	Lr. no. 1/ 2001		X	X	X
		Lr no. 12/ 2005			X	X
4	Trent*	Lp no. 1/ 2008	X			
5	Bolzano*	Lp no. 3/ 2007				
6	Veneto	Lr no. 11/ 2004	X	X		
7	Friuli V. Giulia	Lr. no. 5/ 2007				
8	Liguria	Lr no. 19/ 2002				
9	Emilia Romagna	Lr. no. 20/ 2000			X	
10	Tuscany	Lr no. 1/ 2005	X			
11	Umbria	Lr no. 11/ 2005				X
12	Marche	Lr no. 34/ 1992	X			X
13	Lazio	Lr no. 21/ 2009				
14	Abruzzo	Lr no. 70/ 1995				
15	Molise	-				
16	Campania	Lr no. 14 / 1982		X		
		Lr no. 16/ 2004				
17	Puglia	Lr no. 20/ 2001	X			X
		Dgr no. 6320/ 1989				
18	Basilicata	Lr. no. 23/ 1999				
19	Calabria	Lr no. 19/ 2002			X	
20	Sicily	Lr no. 71/ 1978	X			
21	Sardinia	Lr no. 45/1989	X			

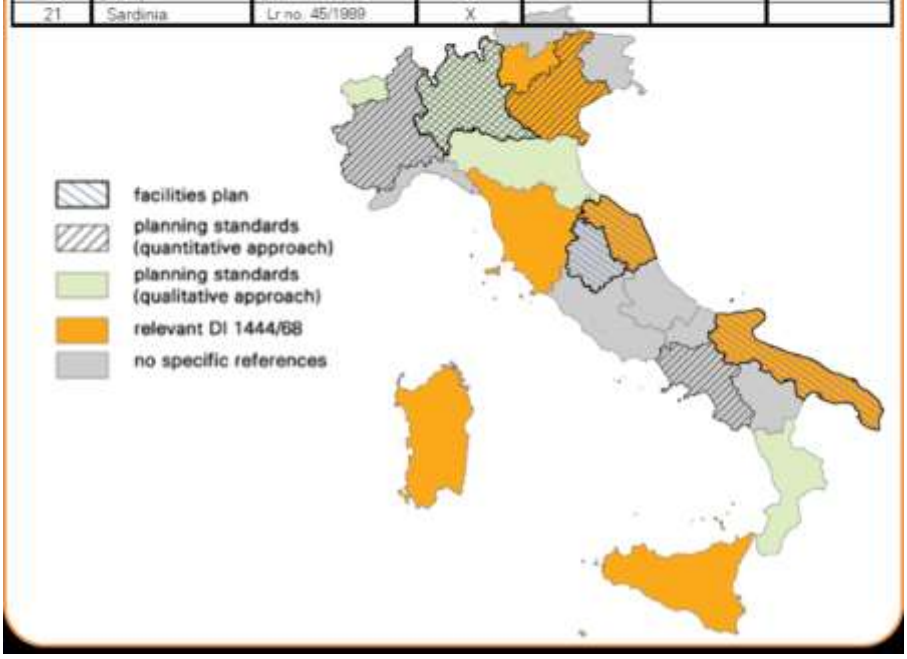


Figure 4.3 Italian approaches in the Regional Planning Laws[27]

[27] Author's elaboration.

Quality standards or planning standards suitable to meet new needs and social demands, which at one time were not taken into account in the DI 1444, are readable, here and there, in the regional laws as claims for benefits that areas and services should give. The regions have not exercised a great fantasy about the project and, consequently, the regional legislation, even the most recent legislation, is old, which in one way or another follows the trail laid down in 1968 by the national legislation. The only Autonomous Region of Valle d'Aosta has explicitly declared its lack of interest in the definition of quantitative standards, stating clearly that its goal is to define quality. The concept of quality and the definition of how quality should be considered and evaluated also appears in the law of Calabria, as well as in the law of Emilia Romagna, and in the last two planning laws of the Lombardy Region. Moreover, in Lombardy, Umbria, Marche and Puglia, the regional laws invite to the preparation of services plans, with a view to their efficiency. In 2005, Lombardy has better defined the Plan of Services (*PdS*), already introduced in 2001, as a thematic planning instrument that legislates in respect of the local services on a municipal scale, defines the operational criteria and implementing policies, as well as the objectives of quality of settlements and welfare performance.
Moreover, it was observed that differences can be found in some regional planning laws compared with DI no.1444. In relation to the users, the regional laws refer to the residential ability to be set up, that is composed of the resident population, the one to be set up and the one gravitating in the municipal territory. The issue of the "demand" must be overcome "at the legislative level, as some regional legislations have already provided (for example, the Planning Law of the Marche Region), referring to the calculation of the urban standards of the resident population instead of the theoretical one, and evaluating new possibilities for settlements with parameters, different from 100 cubic meters, which must be adapted to the specific reality of each municipality and the building types proposed by the Urban Plan" (Oliva, 1999). Moreover, in spite of all their ambiguities and operational problems, the homogeneous territorial zones (*ZTO*) survive in numerous regional laws.
Some LURs specify the standards for tourist settlements, for the administrative centres, for the municipalities of the plains, mountains and hills. For example, the endowment per capita of green spaces is increased in the tourist municipalities. Furthermore, other LURs identify new equipment both quantitatively and qualitatively. Even by the urban

standards in the industrial areas, some regulations require a quantitative increase compared with the provisions by the DI no.1444. Plus, as regards to the measure of the inhabitant, the above-mentioned DI establishes a certain amount of volume, while the tendency of the Regions is to dictate a law or transfer the issue to the wide-area planning, also (in a few cases) leaving to the municipalities the task to define the measure independently and based on more accurate local analytical estimates. Apparently, this is only a technical problem. However, it leads to oversize the supply of areas for houses (as well as the areas for services, but, however, the consequence would not be serious if economic issues relating to their possible expropriation are excluded), causing distortions in the process of implementation of the plan (Ombuen, 2002).

Among the experiences, definitely the new Planning Law no. 20/2000 of Emilia Romagna must be mentioned, which delegates to the general territorial and urban planning the task of defining "qualitative urban, ecological and environmental standards". The qualitative urban standards are defined as "the quantity and quality of the infrastructural system for the urbanization of the settlements and the equipment and public spaces, suitable to meet the needs of citizens". They are connected to the type, the quantity of such equipment and their performance characteristics. Their specification is done in terms of "accessibility, full usability and security for all citizens of all ages and conditions, balanced and rational distribution in the territory, functionality and technological adequacy, simplicity and cost management". The qualitative ecological and environmental standards are defined as "the degree of reduction of the pressure of settlement's system on the natural environment and of improvement of urban environmental health. They are connected to the discipline of the uses and transformations, aimed at limiting the consumption of non-renewable resources and the integrated prevention of pollution, the realization of efforts of consolidation and mitigation of the negative impacts of the human activities, the strengthening of infrastructure and ecological and environmental equipment". In addition, Article 6 of the law highlights the fact that "the City Council, in defining the urban qualitative standards (...) provide for:

- promoting, through special agreements, the development of private activities that correspond to collective usability requirements and contribute, thereby, to expand and articulate the range of services to

be insured to the general public, i.e. to raise the level of quality of such services;
- dictating a specific rule relating to the requirements of private construction projects and the mode of arrangement of its ancillary areas, in order to reduce the pressure on the urban agglomeration".

In 2015, the Liguria Region, through the review of regional planning law, defines the "local amenities" that must be provided by municipalities in their Urban Plan (*PUC*), in order to ensure an updated and adequate level of services and infrastructure, characterized by the quality of performance, more than by the quantity of areas and equipment, which often remained only on the papers of the General Regulatory Plan (*PRG*), and the responsiveness to new needs.
In order to guide the design of the *PUC* and the dimensioning properly of the new "territorial endowments", the Liguria regional structures responsible for spatial and urban planning prepared a draft regulation with the help of legal experts on the subject. A series of consultations with the municipalities on the territory, professional bodies, trade associations followed, in order to illustrate the content and gather the information necessary in view of its approval by the Regional Council. For the different types of facilities were identified physical and dimensional criteria, the features of performance and location, as well as the attempts for incentive mechanisms and rewarding coefficients.
The City Planning Commissioner Marco Scajola explained that through the recent revision of planning law, the Liguria Region has updated and expanded the list of services and facilities to be provided in the municipal plans, with new types capable of responding to current living patterns: generally, cities need spaces for the urban social life, areas equipped for events, for wi-fi, for pedestrian and cycle paths, as well as amenities, to improve environmental quality as the ones for recycling, civil protection, rescue and emergencies.
Even in Campania Region, during spring in 2015, at a conference on the evaluation and on the renewal of the Regional Planning Law no. 16/2004, organized by Inu Campania, it seemed necessary to reflect on the impact that the legislation produced and the unresolved aspects, in order to contribute to the drafting of an updated legal text which takes into account the current and future needs of the territory and of whom live in it. Because of the described issues, the new legal text on the subject of facilities and public spaces should include provisions that bring innovations in reference to the metropolitan and municipal scale;

as regards the dimensioning, in particular by defining the mode of realization of the previous needs; in terms of quality and multi-functionality, and finally, in relation to the method of implementing the provisions (Arena et al., 2015).
The introduced innovations allow a better qualification of the territorial endowments of services and infrastructure, whose design is aimed at curbing the excess forecasts in plans containing preordained constraints for expropriation, confirming, at the same time, those present in the DI no.1444/68 which best meet the aim of incentivizing the spatial planning, the buildings recovery and the better use of existing buildings.

4.3.2 Qualitative standards in the Lombardy Regional Law on the Government of the Territory

The Lombardy Region is an administrative context which has been always characterized by a strong tendency towards experimentation and legislative innovation.
The concept of standard of performance appears for the first time in Lombard legislation with the Regional Law no. 09/1999 on the Integrated Planning of Intervention (*PII*), only to be re-confirmed first in the Lr no.01/2001, through the introduction of the *Piano dei Servizi* (Plan of Services - *PdS*), until it assumed a central role in the most recent Regional Law no.12/2005. In 2005, Lombardy introduced the *Piano dei Servizi*, i.e. a thematic planning instrument which legislates in matters of local services to the municipal scale and, moreover, it defines the operational criteria and implementing policies, as well as the quality objectives of settlements and welfare.
The Lr no.01/2001 introduced the Services Plan as a supplementary tool of the General Urban Plan, in which the autonomous role of the various municipal administrations became increasingly marked, providing participated reports on two levels: horizontally, between public and private entities in order to serve the purposes of both, and vertically between citizens and (municipal, provincial and regional) levels of government. The aim is to build a dynamic and functional governance model capable of reconciling the objectives and territorial realities. Beyond to define the areas to be allocated to public facilities quantitatively, the *PdS* introduced two levels, from the performance point of view, in order to operate an efficient cataloguing and establish possible intervention strategies, such as usability and accessibility. For

the improvement of the city, the sphere of the planning of interventions based on the study of the socio-economic dynamics becomes an important topic, together with the aspect of quantity and quality of services, the upgrade of the standards and their typological determination.
In the law of 2005, obtaining full autonomy, the *PdS* plays a fundamental role for public facilities and public-general interest. In conjunction with the *Piano delle Regole* (Plan of Rules), it "materializes" the strategies contained within the (programmatic) *Documento di Piano* (Planning Document) and, leaving the residual nature inherited from the past, it attempts to give concrete answers to the urban "necessities", either through interventions aimed at upgrading of the existing facilities or with actions to fill gaps in the urban fabric. Its fundamental aims are the promotion of quality and urban liveability.
The "Legge per il Governo del Territorio" (Lr Lombardia no.12/2005), beyond to radically innovate the spatial planning process, based on the principles of subsidiarity, responsibility, sharing and transparency, reinforces the idea that the effectiveness of governmental actions, at various institutional levels, depends on a large extent on an in-depth knowledge of the spatial phenomena and of the quality of available information, as well as of the possibility of direct participation in decision-making processes of the various institutions and citizens.
The most recent regional law also confirms the extension of the service concept to categories that in some way better represent the real needs and user's necessities, compared to the old interpretation of the standards, directed solely to ensure a per capita allocation, without checking the status of existing services and assessing their importance and their effective implementation. Moreover, the determination of the number of users who use the services should be established in relation to the population permanently resident, the inhabitants that must be set up and all the people gravitating in the area. The minimum provision of services is equivalent to the traditional 18 sq.m/inhabitant, but, unlike national law, it has no breakdown by types, and it is necessary to consider the following three parametric/qualitative criteria: "quality", "usability", and "accessibility".
Beyond the main concept of services based on quality, before on quantity, significant innovations are:

- the possibility of introducing areas for public housing;

- the integration with the urban plan for the infrastructure of the subsurface (*PUGGS*);
- the assessment of landscape values of the public green system.

The new legislation provides for the important introduction of public housing in the service system and the importance that the environmental system can and must take on: the territorial scope of study and management is no longer read only at the urban scale level but the integration between the urban fabric and the perimeter of rural areas assume a significant role. The so-called fringe areas or territorial portions interposed between city and country become important since the green system acts as a connector between two morphological and functional different realities. Through this mechanism, the territory tends to be more and more homogeneously and especially integrated.
The Lombard Services Plan is also characterized by flexibility, defined both for its answers to the questions and for the timing in which the interventions are made. In fact, through its constant update, the typical rigidity of the plan choices is exceeded, providing the priorities of the interventions.

4.4 SERVICES AND INTER-MUNICIPAL COOPERATION

Some topics closely related to the planning of services include the reinforcement of inter-municipal relationships, the best use of available resources, and a more rational planning/programming process of systems of the settlement, environment and infrastructure (Nobile, 2012). The joint participation of several municipalities in the concrete implementation of services and equipment allows, in fact, the identification of areas of consultation and policy planning for the services at a supra-municipal level and, in general, the definition of common qualitative and locational parameters and criteria. With reference to the inter-municipal relationships, Nobile (2012) focuses on certain aspects, such as:

- the programming and management of the service system, considering both the endowments which are located in the region and the intangible services, with reference not only to the inter-municipal role;
- the overcoming of administrative limits in the environmental verification/assessment;

- the capacity of the answer to the housing theme, especially the social answer, to a not only local scale;
- the management of the rationalization of the location of productive sectors, which would exceed the pulverized interventions;
- the adjustment of the relations, with reference to local reality through a different level of infrastructural service for mobility.

With regard to the inter-municipality, the Italian law permits some forms of partnership among local councils. One of them is called Unione di Comuni (Union of Municipalities).

The institute of Unione dei Comuni is an administrative tool introduced for the first time by the L. no.142/1990, subsequently corrected by the reform implemented by L. no.265/1999 and then incorporated, with modifications, in the Fundamental Law no.267/2000. Mainly, the changes were related to demographic constraints, the abolition of territorial contiguity constraint and the obligation of the merger. The Union can be used by the municipalities, so that they can organize themselves in an associated manner, in order to provide certain goods or services and respond to concerted interests within a defined geographical area (Brosio et al., 2003), and its duration in time is governed by the municipalities that participate.

The difference, compared to other forms of institutional cooperation, such as conventions and consortia, is that it is a new institution and political entity with legal personality and full operational capacity on all delegated municipal functions. In fact, its institutional structure is prefigured by the administrative political will of the authorities expressed by the statute and not by the dictates of a central legislature. The Union, therefore, has full power to regulate its own organization, the performance of tasks that it has to perform and the financial relations between the participating municipalities.

The Union is entitled to the proceeds from the services that have been entrusted to it and the various contributions allocated to it. In this sense, it becomes a useful tool for small and medium-sized municipalities to recover their competitiveness with larger municipalities, to overcome the difficulties they face in complying with the principle of equivalence and obtain the financial resources necessary for the provision of services to the community. In fact, by realizing synergies and complementarities among the partner municipalities, the Union gives the possibility to reorganize more effectively the limited resources (mainly human and

financial) of each institution, in order to give more satisfactory answers to a wider public but united by the same basic needs. This merit is manifested primarily when the Union proceeds to the activation of new services or to the increment of the quality of the delivered services or performed functions.
From the point of view of the financial resources needed to implement the joint management, it should not be underestimated the contribution represented by the funding of State origin, first and foremost, and by the regional financing, even if, of course, most Unions' revenue consists of the sharing spending entries of the partner municipalities.
With the aim to curb the growth of public spending and streamline services, forms of municipal associations are stressed in the most recent season of financial manoeuvres. For example, the Delrio Law in 2014 provides for facilitating measures of organization and introduces the role of a secretary of Union, chosen from those of member municipalities, and confirms the intention of the legislature to focus on, in the shortest possible time, stable forms of associations among Municipalities. The next intent, with a long-term perspective, is to push (motivate) the Administrators, once embarked on the path of the Union, to point to the merger which remains, by far, the most desired remedy of the government strategy.

4.5 THE INTERNATIONAL NORMATIVE EXPERIENCES

The urban design becomes an expression of the new contents of urban policies, particularly the ones relating to territorial marketing and competition between cities, social cohesion, participation and consultation. In western Europe, as shown by the recent settlement policies of different countries, it can be highlighted the utility of the infrastructural key in order to rethink the size of the government basins of the territorial transformations. Moreover, the new image of urban society is based not only on economic and financial factors but, above all, on social solidarity, relational innovation and the quality of the identity of the places. Therefore, it is important to observe the experiences in progress, in the planning of services in other European countries.

France

In 1967, the *Iarup* (the planning Institute of the Paris Region) processes a series of grids for sizing, in connection with specific territorial areas which should be urbanized. These grids are calibrated for planning the *villes nouvelles*, i.e. poles of autonomous services entered into a competitive regional environment. The endowments are calculated with analytical support and demographic projections, according to catchment areas and levels of services, applied to the various spatial scales. With the publication of *Iarup* grid and the creation, in the same year, of the *Zac* (Zones d'aménagement Concerté[28]), the system of endowments is divided into two categories: the ones for the service of the residence and the so-called "superstructure", on an urban scale (Teyssot, 1977). The sizing of the facilities for the service of residence takes place in a different manner if compared with the Italian dimensioning, in which the calculation is made on the basis of minimum areas per inhabitant. In France, the planning and design of this type of equipment shall be implemented according to the specific case, considering the type of existing (or assumed) demand in the area, the necessary funding and the expected operating costs. The considered parameter is the number of housing, using a set of demographic statistics and indicators, such as birth rates, the type, size and occupation of housing and age of residents classes.

In the nineties, characterized by a highly competitive environment, the investments in more significant facilities were recorded in the sectors of culture and the environment, since they were considered at the same time, driving to the local economy and tourism and comprehensive in terms of consensus for the positive impact on improving the quality of life. Then, a regulatory reform started which involved the rules and instruments of the government of the territory. It started with the Voynet (L. no.99-533/1999) and Chevènement (L. no.99-586/1999) laws in 1999. The reform renewed, respectively, spatial planning in terms of sustainability and the framework of supra-municipal local authorities.

With the Voynet law, the *Snadt* (Schéma National d'aménagement et de developpement du territoire), introduced by Pasquà Law (L. no.95-115/1995) in 1995, is replaced by the Collective Services Plans (*SSC*), in

[28] The constitution of Concerted Development Zones (Zac) falls under the ordinary procedure to create, in a coordinated and integrated way, the urban interventions of a certain entity, putting in direct contact the various actors in the process, enabling to work in a short time with the faster sharing of information and decisions.

which, in addition to healthcare, higher education, research, culture, traditionally present and recognized in the French planning, other services assume equal dignities such as networks of mobility and information, natural spaces, systems of sport and leisure. The *SSCs* represent the documents of planning (not programming), projected on a twenty-year horizon, with the intent to define a flexible framework in possible strategic directions of land development, which is useful to convey projects, programs and interventions of construction of facilities and services, harmonizing the local variations.
The aspect of greater innovation of the law concerns the different identities that can be attributed to the collective services. The traditional standardized vision of the facilities, realized on the territory in a systematic and often incoherent way, is abandoned in favour of a sensitive approach to the effective availability of the service for all users, with joints and specificities related to the needs of the different territories. Moreover, the strategic location of the endowments of services is considered to be driving for the improvement of the quality of life, also to combine the broader ambitions of the urban project with local development requirements.

Spain
The reason that leads to examin the vicissitudes of the urban standards in the Spanish situation is that similar to Italy, also in Spain, the question of a number of areas for services related to the different uses of urban land is regulated by law (Cáceres et al., 2003). Even though these are minimum values, which may legitimately be exceeded in the plan design, in the professional practice they have reached such a degree of stiffness that is simple to talk about minimum-maximum values that are concretely respected because it is a legal obligation.
The first fundamental law, the Plan Nacional de la Vivienda (National Plan of housing) is processed in 1961, in which complementary services are established for three community levels, or thresholds (5,000, 20,000 and 100,000 inhabitants). The range included religious, cultural, administrative and commercial facilities, those for health, welfare and leisure and various amenities (car parks and garages). For many of these services, the reference to the quantity is related to the built area, instead of only simple directions for others.
Subsequently, through the Law no. 19/1975, and the following Reglamento de Planeamiento no.2159/1978, there is the introduction, in

general, of the urban thresholds (neighbourhood units depending on the number of housing) and the amenities, in terms of reserve areas, for open spaces, schools, social services and car parks[29]. A very significant innovation was introduced: the mandatory transfer of these spaces as a counterpart of the surplus generated by the urbanization of the lands, namely the transformation of agricultural land into building land.
In 1988, the urban-planning powers were attributed to the 17 Comunidades Autónomas. The legislation of the Comunidades Autónomas in urban development is wide and diverse, and if, on the one hand, it was maintained, in general terms, within a structure and a mentality with a traditional character, on the other hand, a different sensitivity emerged regarding the use of the territory and its organization. In the Comunidad Canaria, for example, the *LOT* Law no.9/1999[30] provides that in the first level of municipal planning there is the establishment of different general categories (i.e. road infrastructures, the supra-municipal facilities and open spaces such as public squares and parks are classified); for the next level of development planning, the law states in Article 36 the limits of residential density, of building rights and a standard of areas for open spaces and urban facilities, by treating differently the tourist areas, where the standard for urban open spaces is increased. Consequently, also tourist standards are defined, which always refer to aspects such as residential system, territorial and environmental resources, which are the necessary support of tourism itself. It can be also noticed the generic nature of the rule, with the renunciation of urban thresholds and in which the fundamentals of services are represented by the open spaces. It should also be noted the explicit omission, for example, of the school facilities, as well as the disappearance of the accommodation as a common denominator of the urban parameter and the vagueness of which social services are indicated. All this is defined together with the appearance of density and building rights, attached generally to the whole territory.
The innovation of the most recent Spanish legislation is still focused on the identification of indicators of quality of the built space, both in the general provisions, which in the design and implementation. Six themes (or groups of subjects) are the subject of legal regulation by defining the

[29] Their values are closer to the French values: 75 accommodations/ha, between 18 and 25 sq.m/accommodation for school services; between 10 and 16 sq.m/housing for services of public and social interest and one parking space per accommodation.
[30] Ley de Ordenación del Territorio de Canarias, 1999.

standard. Four are conventional: a number of public open areas (green zones), the intensity of building (building rights and density), a number of services to areas (articulated for different types of equipment) and the number of parking spaces (according to the intended use of the various areas). There are two other themes of most recent setting: the amount of public residential building and the so-called "diversity index", only set out but never defined, which should ensure mixité (mixed use of the functions).

4.6 LEGISLATIVE LIMITS AND NEW DIRECTIONS

The evolution of the regulatory framework of standards allows capturing some important steps that have marked the transformation of planning practices and intervention in the service sector. In particular, it contributes to the understanding of how the urban origin of the measures has affected the regulatory adopted system, based on simple parameters, such as the ratio of a number of inhabitants and the amount of land for services. In this framework, the role of urbanism, as only indirect means to govern the supply of areas to be allocated to a set of public services, is fully functional for programming and managing model and interventions based on the total autonomy of an impressive number of public decision-making subjects, which are involved in the process of realization of the services, generating strong diseconomies of time and costs, and tensions at the social level (Clementi, 1983).
The functions that the standards would have to carry out are defined, according to Karrer (2002), in "explicit", "implicit" and "improper". The explicit function refers to the provision of equipment in relation to the articulated needs of the population, thus defining a greater equality of opportunity between the citizens and thereby achieving over time the so-called "public city", in the sense of "collective", as opposed to the private one. The task of the explicit functions is the creation of the district communities and at the same time, the empowerment of main municipalities in the supply of equipment of service of the inter-municipal level. The implicit function also corresponds to the regulation of the growth of settlement by means of the link between settlement capacity, a number of areas for standards, and their expropriation. The standards should have allowed the actuation of direct and indirect land

policy and implemented a crude form of lot's justice. However, just this function has highlighted the policy limits of the standards and thus the need to improve the original setting, with the purpose to correct those aspects which have led, in a sense, to practices degenerative in the use of standards. Indeed, the question of the values of the goods that are used for equipment has become increasingly important with the spread of alternative practices for expropriation, such as the equalization, in which the value of what is exchanged must also be well measured in relation to the enhancement and profit that come true.

The definition of "mandatory minimum" ratios (DI no.1444/1968) for the urban quality is entered in the manuals, in the technique and in the urban practice. However, this definition is now considered obsolete for both the rigidity inherent in the definition of standards, which ignores the different reasons of the articulation of the measures and for the difficulty of translating the prescribed quantities in the further quality of the settlement.

The urban standards defined by DI no.1444/1968 are the same for any type of geographical environment (mountains, hills and plains), and should be sized and designed differently. In addition, the standards of supra-local interest (metropolitan, provincial or even regional standards), the so-called "zone F", are still established by the municipalities, while more properly should be delegated to higher planning levels (Territorial Plans for Provincial and Regional Coordination).

There are also services that did not fit into the category of basic services in the past and that now, instead, they do: culture, leisure, and entertainment. And, again, those services that lurk in commercial activities, which once they were considered only as such: the trading serves to animate the city, contributing to its vitality and its social supervision. Such services are an expression, in short, of a complex and rapidly changing society, very different from people of the 50s and 60s, hungry especially of houses (and, in truth, much less service). However, this clearly contrasts with the nature of the planning forecasts, which must have their stability, also with each spatial conformation determined a priori and for a certain period (Karrer et al., 2003).

Finally, social housing, the subject of a partial reform just prior (Law no. 167/62), is completely absent from the idea of citizen's services contained in the Decree on standards, while it was constituted part of the welfare issue in the other European reformist traditions (Cremaschi, 2002). The housing issue remains in the other European countries one of

the most important themes in the comparison between welfare and urban planning. In Italy, instead, only the Financial Act 2008 (Article 2, paragraphs 258 and 259) has made possible the construction of social housing in areas for standards, feasible with the introduction of the first state-level elements for the realization of political and equalization and urban compensation programs.
However the standard, in the current legislative framework, still remains an element, an ingredient that cannot be ignored and which must be respected in the drafting of the plan. The attempt to define, beyond the quantitative national and regional regulatory standards, other elements of urban planning for services should therefore not appear as a rationalization of a system of values which are not questioned, but as a desire to enrich the issue of services with other elements of urban design (Clementi, 1983).

4.7 CHAPTER SUMMARY

The evolution of the regulatory framework of urban standards allows capturing some important steps that have marked the transformation of planning services. In 1968, the quantitative normative definition of the standardized facilities was not the result of a rigorous evaluation on the best use of the soil, but rather stemmed from a heavy mediation with real estate operators and was configured as a safeguard measure compared to uncontrolled urbanization of the Italian territory. The rigidity of the state laws was then accentuated by regional regulations, which have exclusively underlined a quantitative increase of the areas to be devoted to community facilities. In spite of their purpose was to respond to the community needs, they achieved results in sharp contrast to the predefined objectives. Only in recent years, some regions have shown a sensitivity to their performance, through the introduction of plans for services. The investigation of the chapter is directed also to the international scenario, that allows the deduction of several significant features for drafting public services.
The analysis will continue in chapter five with an overview of the current national practice and international experiences, that will lead the definition of the qualitative parameters to be considered in the planning of services.

5 GOOD PRACTICE FOR TERRITORIAL ENDOWMENTS

> "A city is not gauged by its length and width, but by the broadness of its vision and the height of its dreams".
> (Herb Caen, 1967)

Since the early 50s, the standardized urban facilities have been the topic of various theoretical elaborations of the specialized culture, most of them were based on the Tedeschi's research published on Metron in 1947 (Chapter 3), and have found their first applications in the Italian planning practice at the beginning of the 60s in the popular districts of INA Casa, until they finally were translated into law in 1968 (Chapter 4).
In order to understand better the new aspects relating to the planning of services, the analysis of a composite framework of experiences is necessary. Starting from a general check on the current situation of what is processed by municipalities and practised within the Plans of Services, some elements of evolution can be found, which take place or in progress, in the design of urban standards and assume a significant role in the debate on their reform.
This chapter will examine current good practice, both in the national and international context. Its structure is shown in Figure 5.1.

5.1 BACKGROUND CONTEXT

Currently, the topic of services of public interest is taking a central role in the context of the economic and urban debate, it is being enriched by innovative contents, in the face of the static features that had characterized it in the previous years. Given the central role that services are taking over the quality of life of the communities and the competitiveness of cities in the global system, they have to be reorganized from the point of view of efficiency, considering a supply

and a demand in continuous interaction and evolution. It is evident, however, the necessity to develop the reading ability of needs and of the design of services, on the basis of which it is possible to establish the targets and evaluate the results. All this must be complemented by welfare policies that attempt to restructure the system of citizens' rights and the spread of privatization processes.
The redefinition of the tools and interpretive parameters for the analysis and design prediction seems a necessary step for the functional organization of the facilities and the assurance of a minimum provision of services that must be constantly updated. The current need to redefine the regulatory apparatus on the Italian urban standards, in fact, must find valid institutional responses and concrete applications that still take into account the fact that they are variables that change over time (Campos Venuti, 1967).

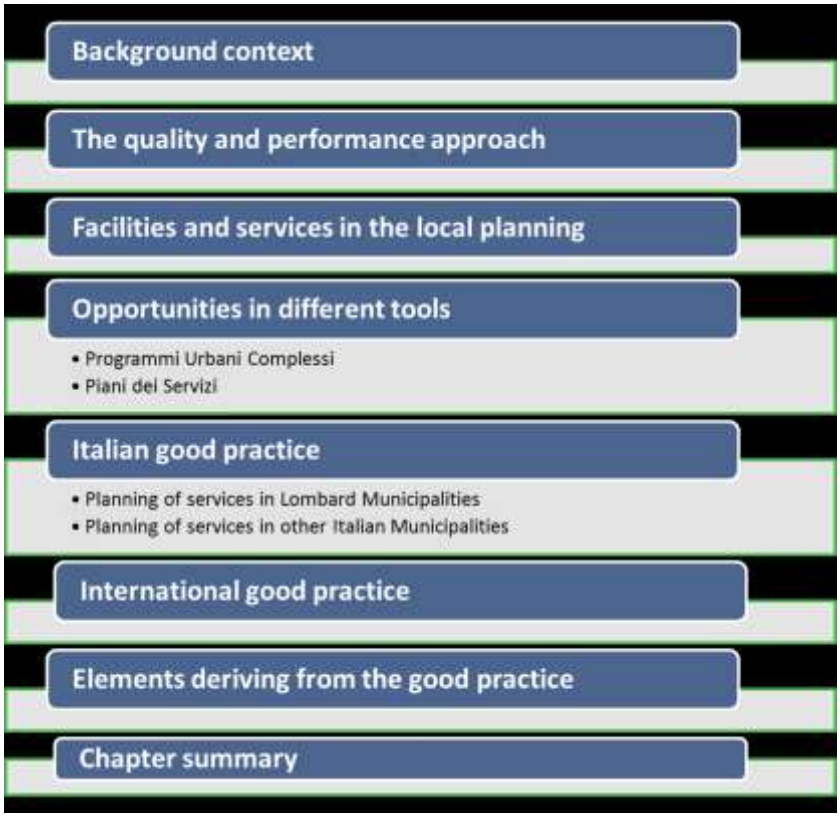


Figure 5.1 Chapter 5 diagram

5.2 THE QUALITY AND PERFORMANCE APPROACH

From the only quantitative approach to the standard, currently, the debate is focused on the research of a standard with high performance, in which, indeed, it is seeking to define the benefits that the facilities and equipment must ensure the residents and users. The aim is to measure the efficiency of the services and, by analogy, the performance of the facilities. The term "performance" refers to the conditions that determine the nature of the efficiency. In this sense, the parameters of performance are more qualitative than quantitative, and, not being uniquely interpretable rules, they "(...) leave the design process open to innovation and to the specificities of the case (...), [as] a result of gathered experience, which are valid until a similar accumulation of experience or other reasons can make mature the certainty that the target values are other" (Gabellini, 2001).

The transition from quantitative standards to the performance ones can be made through the definition of a standard dealt with the real needs of the territory, evaluated through specific and targeted technical, functional and geographic analysis (relevance of the location), as well as the economic and social management. Exceeding the phase of an urban development management on free spaces, the project activity, focusing on contexts that are already urbanized, must respond "in terms of physical and human needs and performance" (Odorisio, 1999). First, it is necessary to return to consider the needs not more generically but in unique and local terms. However, this approach has recently produced a new interpretation of the standards in the preparation of the General Urban Plan (Cáceres et al., 2003), that is always directed in the interests of diversification of the quantities rather than the understanding of the complexity of the local demand (Falco, 2002). Moreover, by restarting from the modes of listening and interpretation of the territory and the users, it can be overcome a generic and misleading vision of needs, making sure that the services and related facilities can effectively respond to them. In this way, it is possible to define a tool that allows the definition of a "strategic vision of the problems" (Cafiero, 1999), allowing the construction of a project of a more complex range of local infrastructures, which corresponds to a different listening of the territory.

Then, two possible levels of intervention can be outlined: on the one hand, the operators have the opportunity to fix the demand considering

the quantity, the size or the rules, with awareness of its improvised interpretation and alternatively, on the other hand, they may think of establishing a compromise between the shared regulatory principles, which are sometimes unique and reassuring, and the various urban and architectural operational choices, since they are more local, but, perhaps, even more flexible. The two alternatives reflect a double reading of the actions that must be carried out: administratively, it should be necessary to define certain rules relating to the planning and deployment of equipment in the area (generally large scale); while, from a planning level, it should be identified interventions that are able to experience from time to time, i.e. innovative methodologies capable of detecting the complexes needs and translating them in directions and design guidelines. Therefore, several actions can be defined with different performance, since they belong to different levels of intervention. As a consequence, the normative production must balance the distribution and dissemination of the planning of the equipment present in a given territory, whose effectiveness is not strictly bound to a check in local scale, while, on the contrary, the provision of the single equipment of the dispensed good and their degree of satisfaction can, and should, be verified mainly on a local scale.

5.3 FACILITIES AND SERVICES IN THE LOCAL PLANNING

In redefining the urban standards, the actual assessment is an extremely important step, through the definition of an interpretative scheme of the local environment, which will take into account the quality of the equipment and services at various levels in the future. However, it is not yet clear what the planning instruments might be able to define and standardize the question of the standard in terms of quality performance. The evaluation of the actual state is experienced within the Plan of Services, that also introduces the concept of negotiated standards and minimum standards. The tendencies to trading with the requirements and the differentiation of the interpretation of local areas are significant in the debate on the procedures of planning tools: inside of which it can be identified interactions between negotiable and non-negotiable requirements (Ombuen, 1999), that are also feasible through a rebalance between different local and regional levels (Falco, 2003). The integration

between the minimum standards and negotiated standards aims for ensuring the democratic distribution of service-facility goods in the territory, which must be secured by classical regulatory solutions, together with the proposition of operational-planning directives (management of physical planning outcomes), to ensure a qualitative effectiveness, constantly monitored and updated. Effectively, to face such a comparison, one of the directions taken by the discipline is to transform the quantitative analysis of the standard, in an analysis of performance/quality, in order to define the level of performance of individual services.

The trend, on the one hand, is to accommodate the transition to a schedule of services that, while maintaining a minimum quantitative standard of reference, introduces elements and parameters related to intangible aspects of services and not scalable quantitatively, such as those related to management processes; on the other hand, there are attempts to put in place a type of flexible and de-localized facility, by designing and managing it, that is not amenable to classical typological classification and highly calibrated locally, as the new experiences of participatory planning for services and facilities suggest.

Therefore, the analysis of some innovative elements for (legal-contractual and operational-planning) regulating has been of prime interest, because able to clear up some guidelines for a qualitative interpretation of the local needs and its possible indexing, also in terms of minimum performance levels that services must achieve.

Some proposals have been identified, within the plans, by municipal administrations, which recognize the effort of a search for innovative solutions (Corrado, 2003) regarding the definition of the new requirements, the qualitative interpretation and the identification of possible minimum performance levels.

With regard to the local situation and the issue of specific services for the residence, the codification of needs is recognized as an increasingly pressing issue with respect to the role now assigned to the planning tool par excellence, the PRG, particularly if the latter must interact with other programming tools of different nature and complexity, such as plans of services and complex programs (Ombuen, 1999; Segnalini, 1999). However, the PRG remains the main tool called into question in the redefinition of the validity of the analysis and forecasting services on a local scale. As for the management of the urban standard, the PRG must either postpone to the national legislation or adopt the regional

legislation, where the regional planner has decided otherwise (Falco, 2002) or, in some cases, provide for and outline specific standards for the "neighbourhood".

5.4 OPPORTUNITIES IN DIFFERENT TOOLS

The review/redefinition of the territorial analysis tools appears to be essential, because, through listening methods and construction of the demand, it is possible to get a perspective restitution in planning formulas (for the control) and programming code (for the forecasts). Therefore, forecasting and planning translate into disciplinary tools, which at the same time limit the territory, allocating it to fixed services for changing needs constantly. As a consequence, the analysis of the needs and its synthesis (objectification) are required to build the demand and its translation into forecasting planning formulas that meet the needs but, often, collide inevitably with the mutability of reality. This balance between analytical flexibility and design synthesis is a crucial point of the urbanism making (Avarello, 2000; Falco, 2002; Ricci, 2002).
The new tools of intervention must be consistent and comply with the directions of the PRG, through systematic actions of knowledge and integration of sectoral policies. In the promotion of multidisciplinary interventions concerning the themes of the labour, education and training, social sphere, the new tools must take into account the ordinary planning and relate to it, formulating coherent and feasible goals.
The *Piano di Zona* (Plan of Zone) as well as the *Piano dei Servizi* (Plan of Services) are priority tools for the construction of medium-term shared objectives, because of the presence of several elements, such as a maturation of the theme of requirements, the introduction of new evaluation parameters, the consideration of the participated project and the reference to the principle of interaction among policies. This means introducing the principles of programming, design and management for new facilities and services, that must be always integrated into the logic of the *PRG*, but with a processing capacity induced by the same operating tool. If the *Piano di Settore* (o di *Zona*) and the *Piano dei Servizi*, already represent a useful addition to the deficiencies of the PRG on the subject of collective services, the *Programmi Urbani Complessi* offer a further opportunity to experience, as well as a different approach to the

analysis of needs and the construction of more complex answers. In fact, the methods of analysis related to the forms of participatory planning recently implemented in Italy through the complex programs seem more relevant to the complexity of the demand. By involving multi-disciplinary knowledge and methodologies of interpretation and intervention, the procedures of the complex programs invite the introduction of critical elements with respect to the technical-scientific construct and the revision of the adoption of the quantitative parameters, which characterize the numerical urbanism, in favour of the introduction of parameters of quality and performance.

5.4.1 *Programmi Urbani Complessi*[31]

The Complex Urban Programs, which have become real urban tools of operating type[32], in fact, permit to operate on the territory in relatively small time, by entering the project in scenery of redesign and thus rewriting of the city, by using "a middle way between the plane and project" (Roda et al., 2001). In addition, the implementation schedule, that is reduced in comparison with traditional planning instruments, and the speeding up of practices, through increased interest in the financial feasibility, make these tools welcomed also by part of private investors. In fact, due to their operational and consensual character, they do not incur in the nodes that have hampered the implementation of the standard, such as the time lag between forecast and implementation, and the burden of expropriation (Avarello, 1999).
The redevelopment objectives have been diversified after the introduction of the Complex Programs within the disciplinary review. First, a Complex Program intervenes in several disciplines, such as physical and natural environment, the local economy, local social aspects, through a "multiplicity of types of intervention" (DM no.21/1994), which is useful to the broader understanding of urban problems. In addition, the delimitation of the areas on which they insist, generally disqualified and chosen because in need of qualification actions, allows

[31] Complex Urban Programs.
[32] At first, the Complex Urban Program has been interpreted as a tool of operational guidance and of implementation of the traditional *Piani Operativi* (L. no. 1150/ 1942) and *Piani di Recupero* (L. no. 457/ 1978). Only later it became a real operational tool of the Urban General Plan, with the exception of the District Contracts of first-generation, activated as implementation of the *Piani di Recupero* (Pozzo, 2004).

actions at the local level, with a better management of the area of investigation and intervention.
At the same time, new judgement elements have been introduced, that are useful to the construction of intervention parameters coincident with a local need for well-being and quality, which, at the stage of projectable formulation, require direct involvement by the population (Roda et al., 2001). In fact, the recourse to consent is one of the leading ideas in the formulation of programs and reflects one of the most innovative trends within the urban practices currently used in Europe.
These innovative elements (multiplicity of types of intervention, local treatment of problems, process acceleration, use of consent) are also reflected in the design procedures of the services and facilities. Trying to overcome the logic of fragmentation, the action is directed to both the pursuit of more complex quality goals, directed to a social and economic mix of building quality and, above all, to the involvement of local elements, of tangible and intangible type. Therefore, the pursuit of integrated objectives entails a departure from quantitative logic, and, instead, offers a local and concerted approach.
"The Complex Programs (...) are inserted into the core of a new planning process (...) and inevitably they constitute a budget oriented to new intervention strategies. (...) [They are] applied within two new hypothesis of the structure of local systems regarding mobility and public spaces. The urban project that supports the program thus constitutes something similar to a local plan of services, that is produced with the consultation of local actors rather than the distribution logic of the standards" (Contardi, 1999).
In addition, the nature of the Complex Programs, intended as integrated tools, offers new space to experiment also different formulas of management and financing, providing for a public-private participation for the construction and management of public spaces and services.

5.4.2 *Piani dei Servizi*[33]

The *Piano dei Servizi* (*PdS*) is the instrument, launched in some territories, whose goal is to address the issue of services according to the perspective of quality and performance: "(...) Several elements, such as the overcoming of the concept of quantitative standards, the privilege of

[33] Plans of Services

the programming situation than the planning circumstance, the enhancement of municipal autonomy also implemented not only in the principle of subsidiarity, find their natural synthesis right in the Plan of services (De Francesco, 2003).

The *PdS* arises, in fact, as an essential link between the service delivery policies, reflected in their planning, and the more general problems of adjustment of the city uses, which converse together in determining the quality of urban life. Also, the notion of public service is redefined, linking it to the concept of general interest and quality of the territory, i.e. the service is constituted of all those activities that contribute to the fulfilment of a need expressed by the population. "(...) The concept of general interest must be considered as the arrangement that, even according to temporal conditions of the given context, better corresponds to criteria related to the territorial efficiency, sustainable development, increased supply of spaces and services, improving the quality of individual and social life of the community" (Lr Lombardia no.01/2001).

The *PdS* is a tool for:

- planning, which contributes to the urban definition and construction of the morphological and functional space of settlements for the services;
- programming, since strategically it allocates the municipal budget, by assigning operational priorities in the medium term in relation to the available resources and to the general objectives of the long term;
- management, through a monitoring and control of the supplied and payable services, as a function of more efficient assessments, choices and operating regimes.

The operational guidelines are mainly related to the introduction of a "qualitative standard", based on the detection of constants of the service and the equipment, which are built on the basis of interviews and real physical and functional measurements of structures and the productivity of the spaces, and consequently the identification of a minimum quantity level. The concept of minimum and negotiated standards is introduced and identified through consultations of the decentralized structures of the local government and users directly concerned. Consequently, different institutional and economic subjects and ordinary citizens interact in search for solutions to ensure the right service at the right place.

"Urban standards are and will be all those specific services and facilities which the local community, over the time, recognizes as basic and

essential for the balanced structuring of the territory, since, in fact, they are constants for its management"(ibid.). By conforming the treatment of the rule to specific local situations, there is a great enhancement of the municipal autonomy and freedom of land management. Moreover, for the determination of welfare policies, the role of the public operator is also redefined: in 2001, the Lombardy Regional Law (no.01/2001) explains that "what is not expressly prohibited is permitted".
The parameter of compliance, that is assumed according to legal-formal evaluations of making urbanism, is replaced by a criterion for compatibility-congruence, and thus consistent with the overall goals placing the programming as a fundamental basis for planning and, simultaneously, contemplating the possibility of subsidiarity between local authorities and public-private partnerships in land management[34].

5.5 ITALIAN GOOD PRACTICE

Addressing the issue of quality in the planning of services is a challenge for municipalities, which are forced today to develop their own policy in a different way than the past, working on a real renewal in the field of urban planning.
The analysis of case studies has the general aim of highlighting some aspects characterizing the urban standards. A composite framework of experiences has been constructed, using a method of analysis, articulated into three stages:

1. identification of case studies,
2. information retrieval,
3. identification of the features which characterize the service planning.

The first stage was based on an assessment of dimensional type. The object of investigation has been in fact the small cities with a population of fewer than 10,000 inhabitants, and medium-sized cities with populations between 50,000 and 250,000 inhabitants. The decision to

[34]As well as it is explicated by the art.118 of the Constitution, and amended by Cost. L. no.03/2001: "(..) The State, Regions, Metropolitan Cities, Provinces and Municipalities promote the autonomous initiatives of citizens, individually or in collaboration, to carry out activities of general interest, on the basis of the principle of subsidiarity".

consider these cases favours the attempt to find several elements of innovation in the use of urban standards in different sizes.
Then, the second selection, of a purely practical nature, was performed, which was determined by the possibility and ease of retrieval of the material necessary for the study of the case.
By analysing the cases of study related to the theme of urban standards in government land tools, the items that may be considered more useful to define the main issues concerning the urban standards were selected, i.e. that may be more significant for the debate and current practice, taking into account the overall objective of the research. (Tab. 5.1)

Table 5.1 Useful elements for supporting a methodology for services planning deriving from a survey of case studies[35]

Item	Description
Reference document	Technical reports, laws, attachments, boards, cards, year of approval
Legislative references	DI 1444/1968, national law, regional law
Dimensions of the analyzed case	In terms of population
Territorial units of reference	Territorial units of study and design
Sizing	Users of the service
Articulation of services	Division of services according to - thematical areas, - added services, - innovative services, - services in the underground network
Quantitative evaluation	Units of measure of the traditional or innovative service
Qualitative evaluation	Features of the facilities in terms of quality, usability, and accessibility
Quanti-qualitative studies for the definition and the location of services	Methodology
Management and planning	Programmatic and economic definition

The aspects taken into consideration in the grid are specified below.
- The *reference document* allows the highlighting of documents, that compose the plan under consideration, in which the information necessary for the analysis can be detected, in order to frame the question in the examined case.

[35] Author's elaboration.

- The *legislative references* help to frame the legislative situation in which municipalities operate (measurement of various types of standards and division of the territory). Therefore, it is possible to highlight, through the overall reading of individual cases, any references to legislation that can be innovative with respect to certain issues.
- The *dimension of the case study* aims to highlight the complementary role of different urban realities and the need to reflect on the relationship between the territories, about possible interactions and alliances, and their interaction strategies that can be put in place with the other municipalities, which, typically, can have also specialized polarities of different rank and belong to the same geographical area.
- The *territorial units of reference* represent the municipal portions needed for the investigations of properly urban and social nature. The geographical delimitation of territorial units, that most times does not assume any institutional value, derives from the objective morphological references (presence of rivers or roadways) or of other nature (districts, census tracts defined by Istat[36] and users' basins for certain services such as those for educational facilities), in a perspective of specificity and peculiarity of the places (Fig. 5.2)

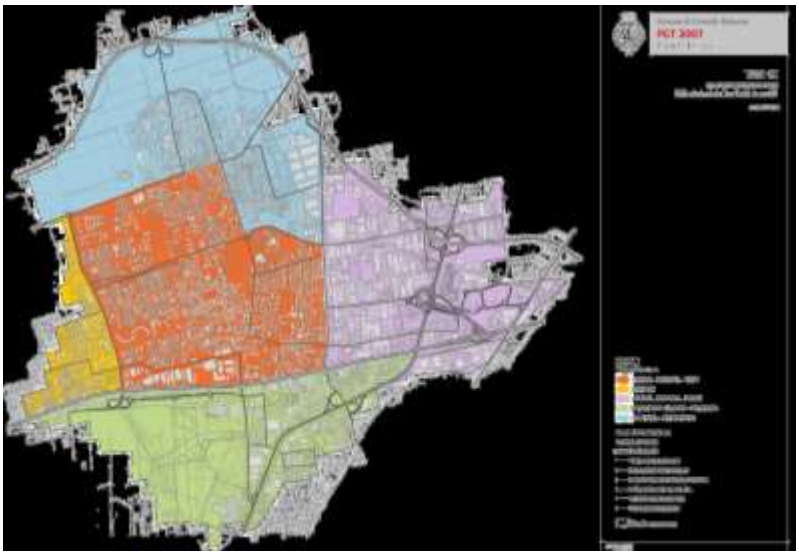


Figure 5.2 Territorial division into areas[37]

[36] Italian National Institute of Statistics.
[37] Source: Comune Cinisello Balsamo, Piano dei servizi (2007).

- The *sizing* wants to define a detailed study of the users, who are intercepted on the territory by the different types of services. The users, who use the service, are divided into three portions, identifying the resident population, the future inhabitants and the population gravitating and fluctuating for study, work or tourism (city users).
- The *articulation of services* derives from the need to some specifications and additions of types of services, other than the ones identified in 1968. Although with reference to the public interest facilities, it is possible to admit an interpretation of the category broadly, recognizing widely the importance of the service and the well-established and wide-spread functions related to the facilities (Fig. 5.3). Moreover, there are the additional services, which, in certain realities, assume the role of services of public interest, as well as innovative services that better adhere to the new needs and socio-economic changes that have occurred to date. Another feature is the integration of the PdS with the equipment of the subsoil, through the provisions of the *Piano Urbano Generale dei Sevizi del Sottosuolo*[38] (*PUGSS*).

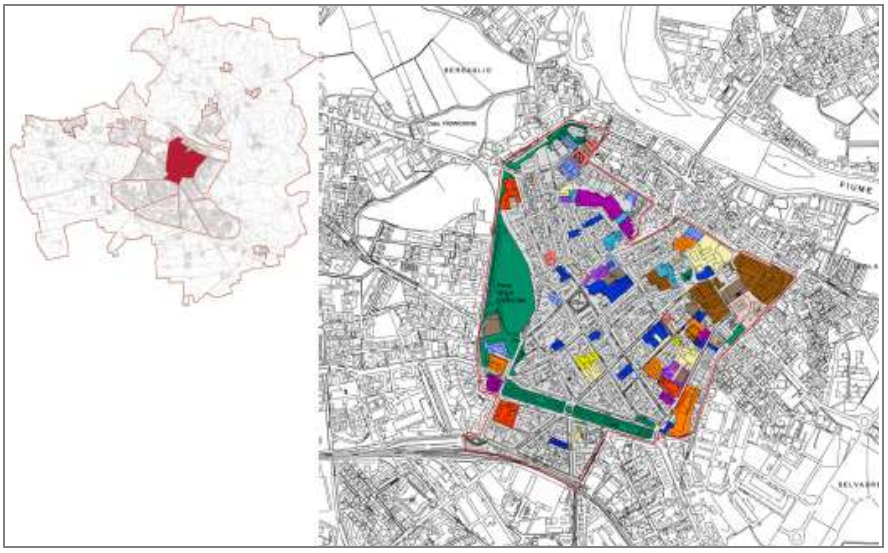


Figure 5.3 Analysis of the endowment of services in one (section "Centre") of 5 sections in which the town has been divided[39]

[38] General Urban Plan of the Amenities in the Subsoil.
[39] Source: Comune Lodi, Piano dei servizi (2010).

- The *quantitative evaluation*, in endowments per capita, can be assessed in different ways. Beyond the land area, it is necessary to evaluate the actual area occupied by the service, with the consequent revision of the lower limits of the endowments.
- The *qualitative evaluation* is done through the criteria, as defined by the law, of quality, accessibility and usability of the service. They are defined by indices or indicators, of a different nature. Some of them are specifically identified as a function of certain characteristics of the facilities and services, while others are derived from other studies: for example, those which derive from the statistical scope, or from the local sustainability.
  Table 5.2 gives the measured indicators, with the same acronym shown in the different examined plans.
- The *quanti-qualitative studies for the definition and the location of services* want to define the applied methodology for the overall assessment of the equipment present in a municipality. In methodological terms, in the most case studies, the only criterion that is studied, on the theoretical-scientific and conceptual basis, is related to accessibility, while other criteria, such as the usability and quality are currently defined by relief and analysis in the field.
  For the Municipality of Giussano, Paolillo (2004) implemented the calculation of accessibility in terms of the parking spaces available to users[40], the topological projection (Fig. 5.4) of the areas made accessible by existing roads[41] and the distribution of the resident population in absolute terms and by age group. Intersecting the data for the topological accessibility of each equipment with the territorial accessibility guaranteed by the local roadway network, it can be obtained the estimate of the spatial accessibility to the concerned service. The accessibility then becomes a measure of the residential sustainability, and through the application of a procedure for multivariate analysis of the interdependencies of the different components of accessibility, it is possible to achieve the definition, for each cell in which is divided the territory, of the corresponding "level of the overall accessibility to the local dimension" (ibid.) to all services, thus ensuring accessibility even to the weaker population.

[40] Assessment needed to estimate the actual accessibility of the equipment considered by private car and according to the corresponding availability of vehicle parking.
[41] Assessment needed to estimate the actual accessibility for each service by any means, also through pedestrian and bicycle paths.

Table 5.2 Review of indices obtained from the case studies for the performance evaluation of services[42]

Criterio	Index	Description
Usability	**Co**	state of conservation (wall structure, horizontal and vertical vestments, toilets, heating systems, arborea density)
	Ad	legal adequacy (architectural barriers, safety, dimensional typological and functional adequacy)
	Ip	penetration index (no. of users / population x100)
	Iaff	crowding index (no. users / no equipment)
	Ip	index of polarity (no. users non-residents / no. users x100)
	B	parameter of management, in terms of conventions and expiration of lease
	D	parameter of usability closely related to the presence or absence of internal barriers, to related facilities and additional services, to the state of conservation and the practicability, to timetables
	Ud	daily users
	If	intensity of use depending on month, year or on season
	Ps	range of service through ratios: users / rooms, user / Slp, users / Sf
	Tu	type of users (divided by age, profession, nationality)
	Bu	the catchment area
	Dsu	spatial distribution of current and potential users
	Cff	presence of different functions together
	Icp	index of connotation of population
	Ivi	Index of entrepreneurial vitality
Accessibility	**Cacc**	accessibility linked to the context, depending on the presence of bike path, car parks, bus stops defined by rays (50, 300,> 300 m)
	C	parameter of accessibility, in terms of parking spaces, the presence of public transport and external architectural barriers
	Up	urbanization of relevance
	Conn	connections: road, cycling, public transport
	As	supralocal accessibility: hierarchy of the road network of the Put
	Al	local accessibility: distance in linear meters from the local public transport system
	Rv	road network (consistency and hierarchy)
	Ss	parking system (supply of parking places, types and regime)
	Pc	cycling and walking paths, existing or designed
	AT	topological weighted accessibility: weighted through the projection of the topological areas made accessible by existing roads (and considered the possible shortage of parking spaces in the vicinity of the service) in a position to determine the actual area of influence of each analyzed and considered local service
	AccV	degree of accessibility guaranteed by the urban road network to the reference unit cell (in which the municipality was been divided), according to the local or urban roads and other roads
	AQ	qualitative degree of accessibility of the j cell to the i service AQij = ATi x AccVj
	A1	citizen satisfaction with reference to the local community, reconstructed using the results of a questionnaire proposed by a local association
	A4	accessibility to green areas and local services for citizens, determined by the population living within 300 m from public open areas and basic services
	B6	movement of students to and from school: the choice of means of transport for the movement of pupils has considerable effect on congestion and on various aspects of sustainability and can reveal any critical system mobility
	GWI	Global Walkability Index: potential access due to the quality and attractiveness of urban space on a personal level
Quality	**Cf**	compatibilità funzionalefunctional compatibility depending on the residential, trade or industrial or mixed context
	Cs	spatial continuity with other facilities and open spaces
	Ca	environmental evaluated conditions taking into account the presence / absence of pressure factors within a specified distance from the equipment. (proximity radius equal to 50 meters; radius of usability equal to 150 meters; range of influence of 300 meters.)
	A	localization parameter that takes into account the compatibility and integration with the context
	Sc	state of conservation
	Vc	Green equipment
	Imp	provision of utilities
	Aus	viability of the service: parking spaces available to users and identification of (possible) known issues

[42]Author's elaboration.

- The *management and planning* have the task of highlighting the implementing provisions of the plan: the endowment of services to be provided as part of the implementation planning and land transformation processes; the determination of urbanisation costs; the use of monetization in the executive plan and in the areas of transformation; the regulation of changes in their destination of use and, finally, the ways to seek the allocation of services as part of the integrated intervention programs.

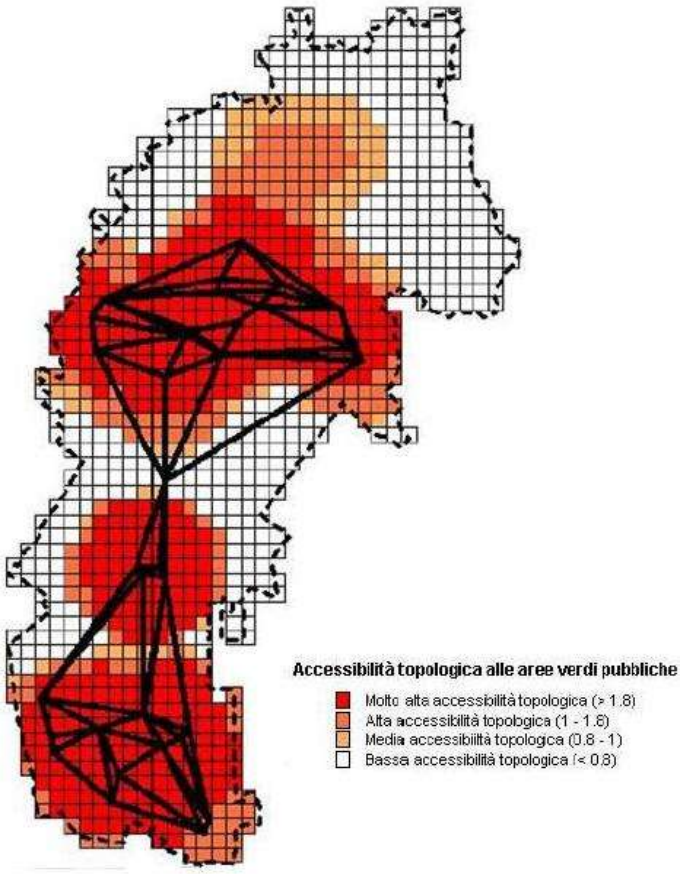


Figure 5.4 Giussano: topological accessibility of the territory to the green areas of local interest[43]

[43] Source: Paolillo (2007:153).

5.5.1 Planning of services in Lombard Municipalities

In 2014, after almost eight years by the approval of the Lombardy Regional Law for the Government of the Territory (no.12/2005), the situation of implementation of the municipal planning tools is characterized by the following numbers: on 1,546 municipalities of the Region, 1,078 have approved their urban plan, 252 municipalities have adopted it and 216 are still being started for drafting (Caldarice, 2013).
Some municipalities of Lombardy were examined, exactly 31, of which 11 draw up a Plan of Services in an associated manner, in accordance with paragraph 6 of art. 9 of Lr no.12/2005.
It emphasizes the need to overcome the logic of the only quantitative standards in order to look, instead, to the quality of the relationship between urban settlements and public facilities, in respect of urban standards resulting from national and regional laws, from which local governments cannot escape. In all surveyed planning projects, a careful (quantitative) verification has been made in order to define the relationship between the size of the settlements and urban activities and the extension of public facilities (Tab. 5.3)

Table 5.3 Synthesis of case studies related to the planning of services[44]

								Articulation of services		Evaluation of services			
#	Municipality	Population [inh.]	Land Area [Sq.km]	PdS [year]	Reference document[1]	UTR[2] [no.]	Types [no.]	Added services[3]	Innovative services[4]	Quantity s	Quality[6]	Usability[6]	Accessibility[6]
1	Merone	4.055	3,25	2007	Rt	6	10	-	cp, c, re	Sf	ScA	ScA	CA
2	Dorno	4.561	30,57	2009	Rt, Nta	-	6	f	re	Sf	-	-	-
3	Robecco sul Naviglio	6.866	20,37	2012	Rt, Nta, ScA	52	9	f, p, as, am, ep, ar, cv	re, c, sa	Sf, Slp, St	ScA	ScA	CA
4	Flero	8.360	9,87	2011	Rt	-	14	f, p, as, am,	c	Sf	-	-	-
5	Martinengo	10.176	21,61	2011	Rt, ScA	7	8	as, c	re, c	Sf	ScA	ScA	CA
6	Merate	14.905	11	2012	Rt, ScA	-	9	f, p, cv, ae	re, c, cp, e	Slp	ScA	ScA	ScA
7	Gussago	15.351	25	2011	Rt, ScA	-	10	f, as	e , sa	Sp+Slp,	ScA	ScA	CA
8	Mortara	15.673	52,12	2011	Rt, ScA	-	12	e, cv	e, re, c	Sf, Slp	ScA	ScA	ScA
9	Melzo	18.924	9,67	2009	Rt, ScA, Nta	-	5	as, c	cp, e, re	Sf-Slp_{piano}+ Slp	ScA	ScA	ScA
10	Giussano	23.464	10,28	2008	Rt, ScA	24	9	-	c	-	ScA	ScA	CA
11	Bresso	26.478	3,38	2007	Rt, ScA	-	10	b, p, as, f, e, am	cp, re	Sf	ScA	ScA	ScA
12	Desenzano del Garda	27.229	60,1	2011	Rt, ScA	3	12	-	c	Sf, Sc, Slp	-	ScA	ScA
13	Cernusco sul Naviglio	30.316	13,33	2010	Rt, ScA	15	12	-	c, e, o	Sf	-	-	-
14	Abbiategrasso	31.146	47,05	2009	Rt, ScA	8	9	-	re, pc, e	Sf	ScA	ScA	ScA
15	Saronno	39.161	10,84	2012	Rt, ScA, T	7	6	-	e	Sf	-	ScA	ScA
16	Lodi	44.401	41,43	2010	Rt, ScA	5	8	-	e, o, c	Sf	S	S	S
17	Vigevano	62.000	82,38	2010	Rt	6	5		re, c, e	Sf	ScA	ScA	ScA
18	Cinisello Balsamo	75.364	12,71	2008	Rt	5	12	-	c, e, o	Sf, Sc, Slp	-	-	ScA
19	Bergamo	117.518	39,6	2011	Rt	22	9	cp, ar, cv, ae	re, pc, e	Sf, Slp, Sq	ScA	ScA	CA
20	Monza	122.263	33,03	2007	Rt	26	9	-	cp, e	Sf	-	-	-

[1] Rt= technical report, Nta= implementing technical standards, ScA= analysis cards, T= boards

[2] UTR= territorial units of reference

[3] b= banks, p= post offices, as= associations, f= pharmacies, c= clubs, am= surgeries, ep= public shops, ar=accomodation facilities, cv= commercial servicesof neighborhood, ae= facilities for events

[4] o= urban vegetable garden, c= bicycle path, cp = path for bikes and pedestrians, e= social housing, re= ecological network, sa= aspatial services

[5] Sf= superficie fondiaria, Slp= sup. lorda di pavimento, Slp_{piano} = Slp of the first floor, Sc= covered area, Sq= qualitative area

[6] ScA= analysis sheets, CA= analytic calculation, S= evaluating summary by type

[44] Author's elaboration.

In almost all the examined experiences, the system of public services is identified and defined in different phases: the first phase, which returns the framework of the actual state of the services, i.e. actual mapping of these services, in order to incorporate, in the assembly, the functionality of the structures; a second phase which aggregates the endowment of services to that preceding phase after the consolidation of the planned changes; and, finally, a third phase that also includes the new projecting public services.
The analysis is extended to all those services which have the character of general and collective interest, both public and private services, overcoming a static, predetermined identification of the concept of standards. In this sense, those services diffused on land management become the object of the survey, often not recognizable by the existence of structures (social services and assistance), but that provide complementary collective interest functions, that, sometimes, are substituted compared to the services provided directly by identifiable territorial structures.
The definition of the location of facilities is very often carried out by means of Multi-attributes or Multi-criteria Analysis, which includes a set of methods for the assessment and the choice of different design alternatives, in which it is important to take into account explicitly the multiplicity of the dimension of the decision problem. In addition, the implementation of a geographic information system, GIS, for the services and for the location of data of the population is an essential working tool.
Moreover, there are several examples of Unions of Municipalities that converse on facilities and services. Three Unions of Municipalities of the Lombard area were examined, which are all located in the province of Pavia. They are characterized by very small entities, both in terms of the land area that the resident population (Tab. 5.4).
Among the examined cases of Unions, the individual services are evaluated in relation to the land area. However, it is necessary to highlight the evaluation in the Union of Campospinoso Albaredo, where a qualitative land surface is considered, by applying a coefficient reductive to the actual land area.

Table 5.4 Urban Standards in the three examined Unions of Municipalities[45]

UNION	PS	TOTAL LAND AREA.	TOTAL POPULATION	MUNICIPALITIES		LAND AREA	POP.	NEW SERVICES AND FACILITIES *
	[year]	[Sq.km]	no.	no.	title	[Sq.km]	no.	
Unione Campospinoso Albaredo	2009	12,91	1.072	2	Campospinoso	3,69	866	en
					Albaredo Arnaboldi	9,22	206	
Unione Comuni Alta Valle Versa	2010	42,80	3.654	5	Canevino	4,74	121	-
					Golferenzo	4,35	216	
					Montecalvo Versiggia	11	577	
					Santa Maria della Versa	19	2.612	
					Volpara	4	128	
Unione dei Comuni Lombarda dell'Oltrepò Centrale	2010	20,05	2.821	4	Corvino San Quirico	4	1.077	en - bp
					Mornico Losana	8	729	
					Oliva Gessi	4	183	
					Torricella Verzate	4	832	

* g= urban vegetable garden, b= bicycle path, bp = path for bikes and pedestrians, h= social housing, en= ecological network.

5.5.2 Planning of services in other Italian Municipalities

In addition to the Lombard Municipalities, who are obliged to adopt the *Piano dei Servizi*, other Italian realities are questioning on the issue of the quality of its services and facilities.

In the relief of the changes undertaken within some PRG for sizing standards for public services necessary for the residence (education, green, general interest and car parking), it is possible to identify some recurring characters (Pecori et al., 2002; Storchi, 2002; Botto, 2002):

- a general trend towards the redefinition of services based on the new user characteristics and on the consideration of non-spatially localized services;
- the attempt to create quality services in substitution of the quantitative standards;
- a reduction of the quantitative sizes for education;
- a considerable increase of the green areas;
- an increase of the areas for car parking, for which very often there is the recourse to schemes of public-private agreements.

The definition of some problems that the cities of Bologna and Modena are trying to solve through the plan of services is now following.

[45] Author's elaboration.

The Bologna municipal territory is divided into areas, which offer a response to the need to identify a limited size of the territory (Fig. 5.5). The identification of the critical situation has not lead to the definition of a list, in a predetermined manner, of essential services for the different territorial levels. Therefore the critical situation has been highlighted through the distribution of the supply in relation to supply itself and imbalances present in different areas. Particular attention was paid to accessibility: a safe pedestrian mobility, the removal of architectural barriers, easier use of public transport and the continuity of cycle paths.

Figure 5.5 Services in the Municipal Structural Plan of Bologna[46]

Moreover, within the Strategic Plan of services of Modena (Fig. 5.6), the service activities may be at managing both public and private. Since having an important public interest, they require, however, a role of direction (upstream) and control (downstream) of the bodies institutionally competent, that is an action of public governance that can only have a local nature. The evaluation of the functional endowment is referred to the urban zones system, combining each identified at a territorial level with a specific endowment of multifunctional services adequate to its role, compared to six issues identified: education, health-care, culture/social life, trade, green-equipped public sports/leisure.

[46] Source: Comune di Bologna.

Most of the significant aspects to detect are some novelties in the definition and in the quest for urban quality connected to the public system of facilities and to their relationship with the urban settlements inside the tool of planning. In some *PRG* there is an attempt to redefine a strategy for services that exceed the logic of mere quantitative endowment of the areas for standards (to make up for, to be added and to polish) through the introduction of a general review of the logic of planning of services and facilities.

Figure 5.6 Example of The Strategic Plan for Services of Modena[47]

5.6 INTERNATIONAL GOOD PRACTICE

The regional and urban competitiveness, on an international level, leads to the observation of the experiences underway in the planning of facilities in other countries. The new image of urban society is based not only on financial factors but especially on social solidarity, on relational innovation and on the quality of identity places. The evaluated

[47] A slide of the author's presentation of the paper *Piano dei servizi: Proposal for contents and guidelines* held in Naples at 8th International Conference on Innovation in Urban and Regional Planning: Input 2014. *Smart city. Planning for energy, transportation and sustainability of the urban system*.

experiences are based on the Community Facilities Plans and Community Plans, which have the purpose of establishing levels of service for community facilities, so they will meet the needs and requirements of the local government and its residents, and optimize the use of existing facilities or design new ones (American Planning Association, 2006). While the community facilities plan has been already defined, community planning identifies long-term objectives for achieving sustainable development through the improvement of the service delivery, integration, transparency and performance management. Most recent tendencies try to promote the integration of community planning and spatial planning at the spatial scale of local government: the land use/physical development, indeed, integrated with the qualitative public services, can improve the social, economic and environmental well-being (Lloyd et al., 2013). The cases of study, located in different continents and each having different dimensional, demographic and social characteristics, were analysed in relation to service delivery mode, the type, reference to the territorial unit, the type of qualitative and quantitative approach, with indications of the minimum values, the types of approaches and analysis of the demand.

The planning of services in France takes place in a sort of local bargaining between all involved actors (including private), on the basis of established rules, that adapt, from time to time, to the local specificities and the system of convenience generated from individual interventions (Tanvet et al., 2013). In urban transformation processes, communities make use of specific professionals, the *programmeur de services*, to check, during a planning phase, the demand for the various categories of services and their feasibility in view of the market and competition with other cities[48].

In the current practice, there is an interesting experiment, consisting in the adoption of areas of programming and intervention that lie outside the administrative perimeters, applying those of the "lived territory". To configure the catchment areas based on converging regions, in which the sharing of interests and actions integrates the different types of resources, it is essential the contribution and active participation of the inhabitants and city users. The sought cohesion affects not only the economic sphere but also the cultural and social field. For this reason, it is useful to launch new networks of services that encourage the inter-

[48] Source Commissariat général à l'égalité des territoires.

municipal cooperation. The perimeter of the inter-municipal basins (the communities of agglomeration, between 50 and 500 thousand residents) is performed by applying a policy, that uses the accessibility indices referring to the displacements from the outer areas to the central places. The outlined spatial distances are linked to maximum isochrones of guidance of about 30-40 minutes with a conventional commercial speed of 22-27 km/h. Thus the design of the space deriving from the inter-municipal cohesion takes place also through the quality of the transport service.

In the United Kingdom the practices of Town Centre Management (*Tcm*), already tested since the 90s, are aimed at the management of urban centres, that face in an integrated manner the social issues, economy, transport and local development projects. By defining shared projects by the stakeholders (who participate in their design and implementation), Associations are created and innovative figures emerge, like the Town Centre Manager. The strategy and the implemented approaches are flexible and can favour the participation of various public and private actors, company forms and different management structures. Defining the land use, the Development Plan prepared by the districts has a streamlined structure containing planning indications and indicative guidelines which leave to the competent authorities a freedom of action quite extensive in the application phase. In any case, the Plans do not represent the only tool able to define the urban transformations. In this country the government of the territory is carried out through flexible instruments, containing the addresses that are the basis for negotiation with the developers.

The planning of services, in one of the countries having the highest growth rate of population in the world, has been analysed through the Hong Kong Planning Standards and Guidelines (*HKPSG*, 2014), which makes an assessment of the land requirements for community uses. The provision of community facilities recommended in this document is based on the growth or concentration of population in a given area. Detailed site and locational requirements of community facilities are defined in a very detailed way: for example the land use compatibility, the nature of offered services, the target users and visitors, the frequency of the target users requiring services of the community facilities, the facilities' integration with the local community rather than segregation. In Table 5.5, there is an example of the design guidelines and standards for educational facilities.

Table 5.5 Design provisions for the Educational Facilities[49]

Facility	Standard	Land or Floor Area Requirement	Area Served
Nursery Classes and Kindergartens	730 half-day and 250 full-day places for every 1 000 children in the age group of 3 - under 6.	@	local
Primary Schools	1 whole day classroom per 25.5 persons aged 6-11. For a 30-classroom school, site reservation at a minimum of 6 200m^2 per school with a minimum acceptable width of 65m is required; for a 24-classroom school, a minimum of 4 700 m^2 per school with a minimum acceptable width of 55m; and for a 18-classroom school, a minimum of 3 950m^2 per school with a minimum acceptable width of 55m. A 10% additional site reservation may be required for new development areas.	A 30-classroom school, operating a total of 30 whole-day classes, requires a site of 6 200 m^2 for 765 persons aged 6-11. Δ A 24-classroom school, operating a total of 24 whole-day classes, requires a site of 4 700 m^2 for 612 persons aged 6-11. Δ A 18-classroom school, operating a total of 18 whole-day classes, requires a site of 3 950m^2 for 459 persons aged 6-11. Δ	local
Secondary Schools	1 whole day classroom for 40 persons aged 12-17 with site reservation at a minimum of 6 950m^2 per school with a minimum acceptable width of 65m is required	A 30-classroom school, operating 30 whole-day classes, requires a site of 6 950m^2 for 1 200 persons aged 12-17. Δ	district
Technical Institutes	No set standard *	-	territorial
Industrial Training Centre	No set standard *	-	territorial
Special Schools	No set standard *	-	territorial
Post-secondary College	No set standard. To be advised by SED on case-by-case basis	Site reservation between 2 000m^2 to 7 000m^2 in consultation with SED	territorial
Universities	No set standard *	-	territorial

[49] Source: Hong Kong Planning Standards and Guidelines (2014).

The new Abu Dhabi Community Facility Planning Standards (*CFPS*) sets out the specific social, educational, cultural, recreational and healthcare facilities that must be provided in new and existing communities across the Emirate. The document provides policies and guidance for the number, type and location of community facilities in project proposals, paying particular attention to accessibility and prioritization of services (through the territorial subdivision in a neighbourhood centre, medium medical clinic, district centre and sub-regional centre). It defines also the facilities which do not need to be in a centre location or do not lend themselves to being located in a centre: the so-called non-centre facilities. These facilities can be located out of the main community hub as they do not need necessarily to have a direct relationship with other facilities, or indeed their presence within a centre may not be desirable, such as a petrol station (Fig. 5.7).

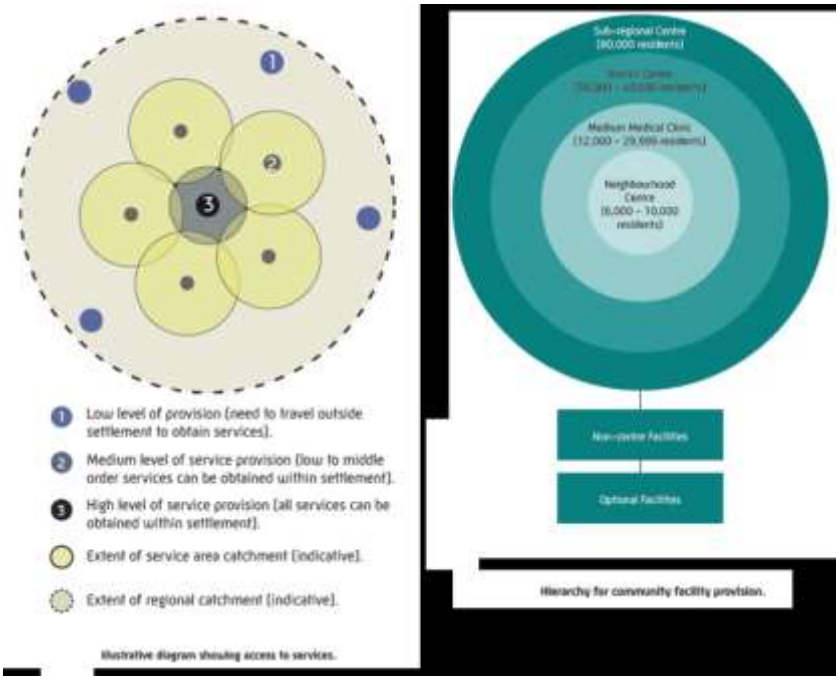


Figure 5.7 Abu Dhabi Community Facility Planning Standards: Planning Context[50]

[50] Source: Abu Dhabi Urban Planning Council (n.d.).

The last case regards the City of Vancouver (Canada). The structure of Cultural Facilities Priorities Plan (*CFPP*) Recommendation (2008) is focused on shifting the role from "planner-provider-deliverer" to "enabler-convener-catalyst broker". Indeed the collaboration, within and among the public sector, its agencies and the wider community and business spheres offers the City the potential to address its social, cultural, environmental and economic ambitions in a more collaborative way. The Decision Framework is comprised of a set of "global" Strategic Priorities for development of facilities that are intended to focus investment over the next 15 years. These have been identified through a rigorous engagement process with the arts and cultural community and reflect a broad consensus on a set of global priorities for the development of facilities (Fig. 5.8).

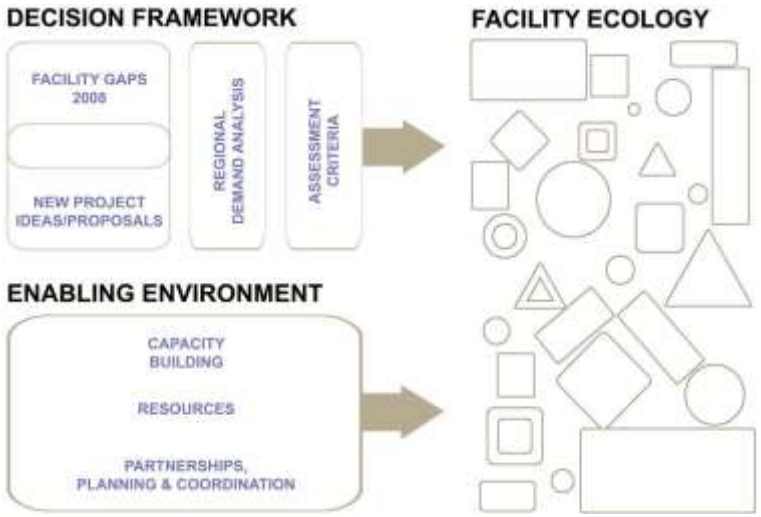


Figure 5.8 City of Vancouver: Facilities Priorities Plan[51]

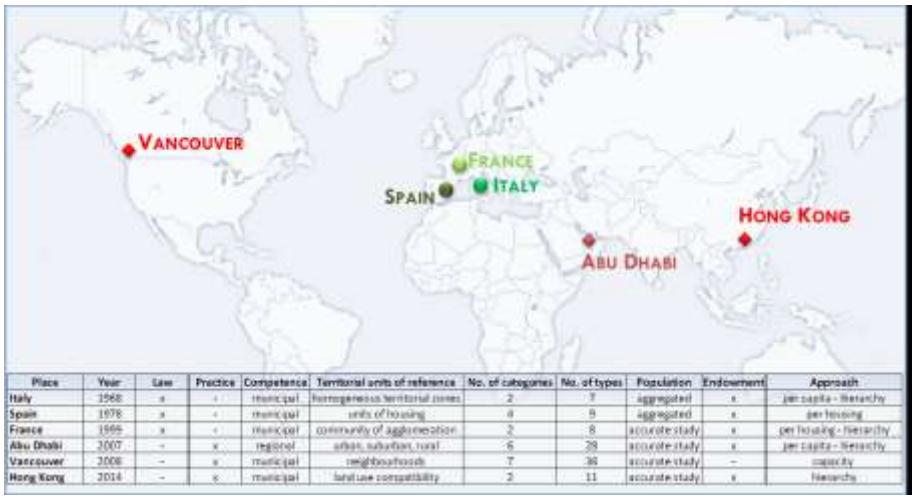
In conclusion, the study of the different cases has allowed highlighting some points in common, such as:

- appropriate community facilities are designed and provided for all citizens;

[51] Source: City of Vancouver (2008).

- they have to be appropriately sized, located and accessible, ensure the best use of land, allow the flexibility for possible future demographic change;
- their need is weighed equally against other spatial and land use requirements when planning sustainable communities;
- the bargaining between the different actors of the planning, management and use of services.

Figure 5.9 shows a resume of the study.



Place	Year	Law	Practice	Competence	Territorial units of reference	No. of categories	No. of types	Population	Endowment	Approach
Italy	1968	x	-	municipal	homogeneous territorial zones	2	7	aggregated	x	per capita - hierarchy
Spain	1978	x	-	municipal	units of housing	8	9	aggregated	x	per housing
France	1986	x	-	municipal	community of agglomeration	2	8	accurate study	x	per housing - hierarchy
Abu Dhabi	2007	-	x	regional	urban, suburban, rural	6	28	accurate study	x	per capita - hierarchy
Vancouver	2008	-	x	municipal	neighbourhoods	7	36	accurate study	-	capacity
Hong Kong	2014	-	x	municipal	land use compatibility	2	11	accurate study	x	hierarchy

Figure 5.9 Planning of services in different countries[52]

5.7 ELEMENTS DERIVING FROM THE GOOD PRACTICE

The current debate, in desiring a reform path of the urban standards, emphasizes the importance of having as its objective the quality of the city, which cannot be guaranteed by the application of zoning and/or quantities of areas for services: consequently, new and renewed criteria and parameters are needed, that can interpret the need for quality. Magnaghi (1981) states that the quality of the city can be made explicit by offering diversified services to a diverse society, in relation to the new needs and places, intended as territorial parts characterized by their own identity. In this sense, the territory becomes the sum of places, which

[52] Author's elaboration.

have specific equipment and their identities, whose boundaries are artificially tracked by social, historical and cultural relations, that are established in the same territory (Clementi, 1983).
From the analysis of practice in services planning, the orientation to define new methodologies emerges for the identification of "management indicators, to measure the *economic efficiency* and *social return* in the relationship between needs, service performance and use of resources" (op cit.).
The inadequacy of the techniques of measurement adopted currently for services is due to a methodological approach that privileges above all the inputs: needs for and equipped physical spaces. The traditional ways of measuring the services are geared mainly towards the supply and tend to privilege the control of the quantities. In fact, the urban standards quantify the relationship between a unit of supply and unit of demand, expressing it in terms of endowments of services in the territorial units and of the population. Such information, however, while maintaining its validity, is insufficient for a rational policy of services. Consequently, this requires the integration of traditional measures and others suitable to describe more adequately the behaviour of supply and demand service (ibid.).
First of all, the demand can be measured through techniques of demographic analysis, designed to single out groups of people and to describe them with a high degree of accuracy and spatial disaggregation. In operational terms, it would be useful rebuilding statistical profiles of families, even if there are great difficulties in finding updated and accurate data from the varied sources. "The analysis of patterns of the high aggregated population should be abandoned in favour of a varied articulation of the different social groups with their needs. The breakdown of the demand subjects allows operating appropriate cognitive insights on the components of the demand in conditions of high vulnerability with respect to mechanisms for economic and social development. On this knowledge, it is possible to set the high selective intervention policies, which concentrate the investment of public resources on the subjects of greatest need, and that shed light on the misunderstanding of policies falsely egalitarian that lie behind the use of 'guaranteed minimum standards'" (Clementi, 1983: 64).
Similar issues are caused by measuring the supply, where the available data are affected by fragmentation and segmentation due to the modes of management of the service system. One possible solution is the

adoption of regional offices, able to control constantly the territory. They serve as information centres and monitoring centres, within which the preparation for a new verification approach of needs and formulation of answers by specialized operators assume major importance. In fact, through a constant dialogue with the citizen/user, they try to "give the word to those excluded" (Ferraresi, 1994) and understand and restore the complexity of the instances.
In addition, the output measures related to the production and management of the service are becoming increasingly important for public policies, especially in the current situation of stagnation of the development and of growing scarcity of resources for investment. Among them, it is possible to highlight the measures for achieved social effects, the impact on the budget of the local authority, which provide for services, and other public entities that contribute to the expense, and other effects related to the relationship between needs, resources and performance of the system of services (Clementi, 1983). The citizen/user also becomes the controller of the delivered service and passes from a passive role to an active role of "co-designer" and "co-manager" of services (Karrer et al., 2002). It is possible to outline the problem of the transition from the construction phase, listening and thus evaluation of needs and the subjects and their translation into a "place and forms of the alleged treatment of the same" (Ferraresi, 1994).
The issue of services defines strong connecting elements with other instruments of the government of the territory, for which welfare policies, specific on social welfare and health services, in addition to the housing and the environmental policies, end up also to interact with the economic, employment and training policies.

5.8 CHAPTER SUMMARY

In order to measure the efficiency of the services and, by analogy, the performance of the facilities, a review and a redefinition of the urban planning tools appears to be essential.
Addressing the issue of quality in the planning of services is, indeed, a challenge for municipalities, which are forced today to develop their own policy in a different way than the past, working on a real renewal in the field of urban planning. By analysing the current national and

international practice, it is possible to identify the necessity to maintain a minimum quantitative standard of reference and the introduction of elements and parameters related to the intangible aspects of services, strictly connected with their performance and the management processes. Consequently, flexible and de-localized facilities must be highly calibrated locally. The balance between analytical flexibility and design synthesis is a crucial point of the urbanism making.
These are the themes that have characterized chapter five. Moreover, this chapter concludes also the phase of analysis of the research and allows the transition to the methodological proposal with the beginning of chapter six. In the following chapter six, indeed, the research proposal will involve a series of designing elements and location aspects in order to improve the ways of planning services.

PART II – METHODOLOGICAL PROPOSAL

6 PROPOSAL FOR THE DESIGN OF INNOVATIVE COMMUNITY FACILITIES AND SERVICES

"Better City, Better Life".
(Shanghai World Expo, 2010).

After the analysis of the current situation based on the study of theoretical models, technical consultations, national and international regulatory framework, and the experiences in the planning of services, it is possible to outline a research project, starting its development from several of its components.
The focus of this chapter is to highlight the key elements of the proposal, through an exploration of the several strands necessary for the innovation in the service system. Moreover, in the last part, the chapter makes a further consideration on the fact that new services must be reorganized and complement the traditional urban standards, since they reflect the evolving society, with its new forms of living, innovative working styles and various ways of accessibility to the places.
The structural organization of chapter is represented through the diagram in Figure 6.1.

6.1 BACKGROUND CONTEXT

The services and facilities combine to ensure that an area is a good place to live, by including the availability of political, educational and social support, good relations between the constituent elements, a healthy physical environment, and economic opportunities for individuals and businesses. They must, therefore, ensure minimum essential levels of social and environmental performance in the area. These levels should be clearly identified, also by increasing and diversifying the types defined almost fifty years ago, i.e.: social care and health, education, innovation

and research, exercise of freedom of religion, the usability of the leisure, culture and sport, mobility, accessibility and public transport, the network of pedestrian and cycle paths, enjoying the scenic and historic heritage, the centralities, places for meeting and socializing, the protection of economic initiative in line with the social utility and job security, social housing services, the presence of neighbourhood businesses.

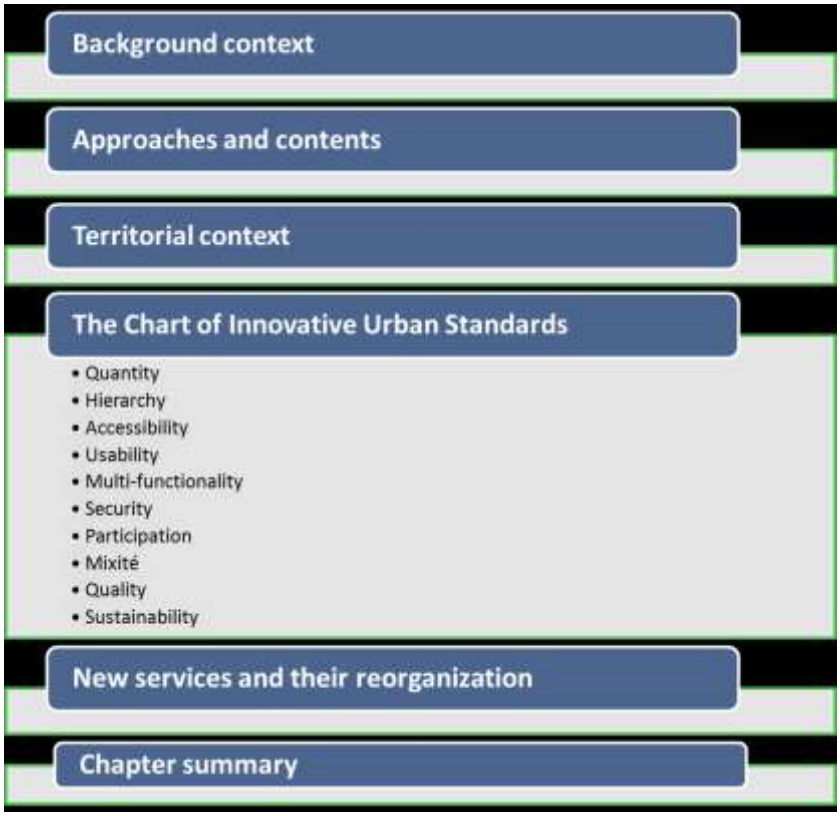


Figure 6.1 Chapter 6 diagram

The urban standard becomes a parameter or an indicator increasingly diversified. It is characterized by the transition from a "tool of abstract implementation, understood as a generalized possibility of undifferentiated quantity of services, to a direct programming tool to provide a rational and comprehensive solution to the needs of quality and, in general, for the infrastructural needs of municipalities, and

directed, therefore, towards the necessity to establish substantive responses to different needs" (Lr Lombardia no.01/2001). Therefore, the transition from quantitative to qualitative standards implies the introduction of parameters, which have to be more tied to the interpretations of local (morphological, political and social) realities and to the actual contribution of urban and environmental quality that the service can offer to the local community.
As a consequence, the planning of services must be characterized by elements, whose features are:
- general, since the connection with different fields of action must be considered on a given territory;
- innovative, because of the implementation of innovative ways against tradition, paying particular attention to the qualitative aspects;
- sustainable, as the primary objective is the growth of the quality of life of the community in its social, morphological, economic and environmental components.

These are the characteristics of a renewed welfare for cities and communities. Indeed, the demand for quality of the services and performance of the cities must be seen in relation to the role increasingly pronounced which the facilities have achieved, becoming subjects of territorial cooperation and competition.

6.2 APPROACHES AND CONTENTS

The project of the services of a territory is closely related to its development. Indeed, the evaluation of the overall endowments of a regional area, in terms of services for the population, is crucial to define the project of development of the city.
As part of an innovative approach to urban standards, the considerations, that must be made, are various, such as:
- *definition of territorial units for study and project;*
- *determination of the unit of measurement of the service and its performance:* defining qualitative parameters of effectiveness, efficiency and quality;
- *definition of users* who use the service: taking into account the settlement capacity and the floating population for study, work or tourist flows;
- *the introduction of new services;*

- *evaluation of un-spatial services*, namely the ones that, for their functional and locational characteristics, do not occupy areas, but which should be still considered as standards relating to their level of response to social needs (service of domiciliary care or mobility, telephone services, garbage collection, cleaning and maintenance of roads, maintenance of green parks and network services, local public transport, underground utilities and public lighting).
- *evaluation of the technological amenities*, for example, service stations, plants and structures, and ecological islands;
- *evaluation of the territorial services,* defining the performance rate of this type of service to the municipality where it is located, but also the rates related to the municipalities who benefit from it;
- *evaluation of private services of public interest:* verifying its public utility and the performance level.

This means reconsidering the size of the territory and the area of project intervention within which it is possible to articulate the different categories of needs, on which the various local bodies must be compared (Pecori et al., 2002). Then, the problem of identification of the extended and, at the same time, contextualized demand, and the construction of a physical, flexible and functional response come back. If the benefits provided prevail on the service location for some types of services, instead, for all others, localization of the service is essential and the accessibility to the service is a consistent part connected with the assessment of the needs.

It is possible to define the different steps required for the planning of services (Regione Lombardia, 2005):

- *spatial articulation*, namely the definition of territorial units of study and project, within which to assess the presence of a minimum level of performance of services;
- *identification of existing services in the territory and their deep knowledge*. It is necessary to consider the service unit and its performance. Moreover, the definition of users has to be explained by taking into account the settlement capacity and the changing population for study, work or tourism. For each type of service, it is necessary to conduct a detailed analysis in terms of cost and effectiveness that, starting from the considerations of managerial efficiency can allow the identification of the considered optimal threshold values, compared to the number of users, the usable area, and the land area;

- *estimates of the service's needs*: each territory is unique and characterized specifically by its needs for services. The estimation must necessarily take into account, in addition to the request of the resident population, the demand that is generated by the flow of people and stakeholders gravitating every day in urban centres for different reasons;
- *the balance between supply and demand*: a number of basic services should be guaranteed to all, by checking whether the public service is able to consider specific local requirements and characteristics of the population. If deficiencies occur, this balance allows the research for original solutions, suitable to the territory, and the identification of the economic and social priorities. Through a comparison of the potential demand for each service equipment (due to the resident population, present and potentially predictable within the forecasts of the Structural Plan) and the offer of existing public and private facilities for services, it is possible to determine, for each urban area, specific and significant elements in relation to the comparison between the current dimensioning and the potential demand identified for each endowment;
- d*esign development of the service plan*, which communicates immediately the expectations that citizenship projects in a short and medium-term future for a better quality of life;
- *evaluation of the economic feasibility of the plan*: in order to give the plan an operational value, it is necessary to define how the resources can be retrieved. For this reason, the plan of services must be interrelated with other sectoral plans and programs, and implemented in line with the *Programma triennale delle Opere Pubbliche* (Triennial Program of Public Works) and their *Elenco Annuale* (Annual List), also including private projects;
- *monitoring and control*: which define the flexible and dynamic nature of this tool since needs and services are evolving continuously, as well as the means to implement them.

The planning of services, therefore, must be developed through a methodology so that it can take on the character of an innovative tool for the design and management of the public city that, starting from the current situation of existing services, defines the strategies in the medium and long period.

6.3 TERRITORIAL CONTEXT

As regards the identification of the settlement features, four types of areas seem appropriate to recognize, that are differentiated by morphological features and different aspects related to settlements, utilization and organization of the territory. Within these areas, having regard to the location of the settlements, the performance of services can be guaranteed, in order to correspond practically to the actual needs of life that can be found therein (Provincia di Genova, 2002).
The types of settlements can be identified as follows:

- *mountain areas* (*Mo*), characterized by poor housing, difficulties for road communications, lack of profitability of services and agricultural, industrial and handicraft activities and consequent demographic trends, that tend to be decreasing;
- *inland areas* (*I*), where the settlement system is an integral part of the rural territory;
- *coastal areas* (*C*), for which it is established the prevailing tourist vocation, given to the presence of landscape values of recall and concentration of the receptive and recreational activities;
- *metropolitan areas*(*M*), where there is the predominance chiefly of built tissues, the plurality of destinations of use and the rural area is a mere frame. The built fabrics have replaced in part the rural fabric, mainly in valley areas and along the road infrastructures for transport, with phenomena of ongoing saturation of these areas for intermingled residential and industrial purposes, to which adequate levels of infrastructure and services do not match.

The placement of Municipalities within the types of above areas takes into account the objective characterizations and propensities to the transformation of the territory, resulting from a basic description.
In Figure 6.2, all the possible interactions between the various territories are highlighted. Obviously, since some contexts are not compatible each other, for example, the metropolitan and mountain, the contexts of the matrix will be characterized by empty cells.

CONTEXT	MOUNTAIN	INLAND	COASTAL	METROPOLITAN
MOUNTAIN	Mo	MoI	MoC	
INLAND	MoI	I		MI
COASTAL	MoC		C	MC
METROPOLITAN		MI	MC	M

Figure 6.2 Array of territorial contexts[53]

6.4 THE CHART OF INNOVATIVE URBAN STANDARDS

The considerable importance of the (public and private) sector of services in the life of the contemporary city requires careful attention to their design and implementation since services constitute the cornerstone of sustainable and supportive development. It is also essential to ensure a good interaction between the service provider (generally local authorities) and the users.
From the design point of view, the difference between product and service is substantial: it is necessary to predefine the exact morphological configuration and the interaction between those who benefit from the service and who delivers it.
Planning must place the user of the service at the centre of urban choices and proper qualitative and quantitative choice can only come from a

[53] Author's elaboration.

deep understanding of society that constitutes and will constitute the city. It is necessary an understanding of the actual implementing social dynamics, the existing and future social differences to be resolved, cultural diversity that is maturing and that should be exploited by ensuring full opportunities for all. The treatment of the issue of public facilities is thus reinterpreted through an absolute pre-eminence of local space as opposed to the unifying general model, as well as the consideration of an informal variety of subjects, as opposed to the institutional dimensional character previously established.
In order that a good planning can increase the quality of life, it is important that the choices are supported by relevant experts and planners, who have the tools and use the appropriate techniques to interpret the complexity and dynamics of planning. Starting from this basis, and with awareness of the need for procedural innovations, the chart of the innovative urban standards defines the basic principles that must be assured in the programming, planning and verification phases of facilities. Such chart, appropriately up-datable, has the aim to highlight all aspects related to the services, which, among other things, are interwoven with each other, but, unfortunately, very often are forgotten.

6.4.1 Quantity

The traditional approach of the extent of services from a purely quantitative point of view has produced the loss of the fundamental objective to encourage the planning of services as an integrated and coordinated system. However, the quantitative recognition of the need is significant for a real and coherent design of this basic network supporting to the settlements.
The control of urban quantitative aspects of the endowments of services is easily verifiable with reference to the calculation of the urban standards, while the qualitative aspects are difficult to measure and can be parametrized, being tied to requirements of functionality, accessibility, usability and efficiency and effectiveness of the tool (Giallanella, 2009). The quantity is, in fact, a spatial referring device in order to relate to the endowments of the context and the users, and, moreover, being the inseparable link between quality and quantity, the latter becomes the premise or the postulate of quality.
The size of the service is traditionally measured, in a first instance, quantitatively, as a function of the type of facility and then brought back

to a land surface. The question then moves to the possibility to measure the facility not only in relation to this surface but, also, in relation to different services that it delivers. Consequently, it is also possible to reach a different quantification of the standard of areas for a certain service, or to a more efficient exploitation of the planned areas (Falco, 1993). Starting from the concept of facilities that can provide different services, for the principle of multi-functionality, as it will be seen later, it is possible to evaluate the useful area or gross floor area of each service, and therefore achieve a more specific dimensional evaluation considering the number of users, and not that of the inhabitants. Further consideration is related to the un-spatial services, which cannot be measured in terms of area, but in terms of the served population.

6.4.2 Hierarchy

The study of the relationships among the various centres of a territory and their evolution following the planning choices allows the delimitation of the territorial system, in which most of the economic, social and cultural rights of the population are solved This makes possible to calibrate the choices of location for different activities and urban functions, among which, of course, the services and community facilities are also included. On the delimitation of urban and regional systems exist a wide range of interpretative schemes, both qualitative and quantitative schemes, ranging from economic and behavioural sciences, and those of transport. The most common quantitative methods are those based on the number of trips between the place of residence and place of work. The uncertainty and difficulties that scholars and engineers have in identifying the territorial systems are the basis of endless discussions on the division of metropolitan areas, which, to date, as resulting from the reports prepared by the Istituto Nazionale di Urbanistica (Properzi, 2007; 2010), the law, and not least the Delrio Law (2014), has defined mainly on the basis of political criteria and relations between the different administrations.
The organization of services, according to a principle of equity, requires, in theory, that the entire territory eagerly desires the same degree of accessibility to services, broken down by levels, also aiming at the reduction of forced mobility: the services must be at the minimum distance from housing, consistent with the criteria of efficiency and cheapness of their distribution in the territory. When a municipality, for

its dimensional threshold, is not autonomous in the planning and management of all the basic services for the population, the need to refer to a wide territorial scope is evident immediately. The theme is particularly relevant since the relocation of some higher activities from major urban centres to outlying areas of a region aims at building the so-called poly-centric city, on which the debate is still ongoing.

As a first approximation, in relation to that, it will be necessary to identify more reference territories, integrated according to a functional approach, in which those of the upper level, which contain the rare services include those of a lower level. The reading schemes, interpretation, and intervention on the territorial structure are, therefore, based on an integrated concept of the functions and their morphological organization. The central place theory by Christaller (1933) answers to these requirements. However, the cause that could limit the effectiveness of a thus conceived project of facilities is the behaviour of users, increasingly characterized by a certain independence from the spatial references. Indeed, the location of the centres of service does not correspond to the amount of population: the rare services are concentrated in a few cities, but Milan, for example, while having the same number of residents of Naples, is located on a higher hierarchical level, as well as Tokyo compared to Mexico City. Conversely, the distance assumes a significant importance for some services, such as for the telematics. They can be also located in decentralized areas, becoming essential means for their development.

Making a choice on the facilities, according to the methods of classical planning, involves some limitations, among which:

- the difficulty of identifying the actual territory of influence (which does not result from the simple application of the radius of influence), and then the people who really gravitate on the equipment;
- the definition of the choice only on the basis of the current supply shortages, assessed by reference to the minimum standard, with respect to future users' expectations;
- the distribution on the territory, that, in the best case, is only related to the optimization criteria of the access times and costs;
- the lack of consideration towards some key factors in the preference assessments made by the user.

Consequently, the classical planning should be complemented by real local marketing techniques. According to them, the facilities are chosen

in order to increase the competitiveness of the region as a whole, seeking synergies not only between different actors but, also, between areas with different vocation. The problem of the definition of the territorial scope, therefore, should be seen in other terms with respect to the traditional practice and with new spatial references, both because of new types of endowments and their role in the competitiveness of the territories. For example, a system of equipment for the residence and care of the elderly, with a view to the competitiveness of the entire territorial system, can extend its catchment area to a supra-municipal level, especially if complemented by a high level of urban liveability.

These simple observations allow the conclusion that, in the present prevailing socio-economic system, it is not possible or does not make much sense to search for the location of potential users, but only a target of a widespread audience can be identified. Therefore, it is possible to propose a procedure that considers multiple reference spatial areas simultaneously (minimum units of service, sectors of services, municipal, supra-municipal or regional boundaries), different for each type of facility, which must be identified and compared with the optimum utilization criteria by the local user, and with respect to the external promotion criteria (inter-municipal, regional, national or international level) of the opportunities offered by the area (Fig. 6.3). However, the urban research has not yet been able to identify a general model for the definition of areas and any systemic analysis cannot be made without on-site observations of the phenomena.

Within these territorial areas, it is also possible to define a hierarchy of services. The service is more rare and specialized by passing from the small spatial areas to large ones. Moreover, the higher is the spatial concentration of services, the stronger is their ability to attract population from the surrounding area. It is possible to define five levels of services:

1. *supplementary services* (additional facilities and services): which are necessary for the use of one or more predominant services, generating relations, through a sharing community approach. They are placed in consideration of relations of contiguity between compatible functions and, moreover, they must be coordinated through a management system (concierge, spaces for physical activity, parking spaces for bicycles, space for leisure);
2. *local or basic services*: they are the neighbourhood services, which establish an opportunity for exchange and source of enrichment of

the urban space and its scene (kindergartens, primary schools, green areas within the neighbourhood, bars, grocery stores);

3. *urban services*: which are designed to meet the daily or weekly needs of a large part of households and/or businesses (secondary education, car parks, facilities of public interest, religious facilities, basic health facilities, green spaces for play and sports, banks, public transport, network services and sub-services);
4. *general (inter-municipal) services*: they grant access to part of the population, or turn to several families or companies on an only monthly or weekly frequency (high schools, green areas of inter-municipal interest, health, administrative and cultural facilities of supra-municipal interest, spaces for exhibitions);
5. *regional (rare) services*: that are required by specialist users (services to businesses, large universities and research centres, hospitals with specialized departments, airports, ports, stations of the national lines, logistics centres).

Figure 6.3 Hierarchical network of community facilities[54]

6.4.3 Accessibility

The accessibility to urban and territorial opportunities becomes essential to the development of the quality of urban life, as well as to the promotion of ann urban structure and shape that aims at spatial and environmental justice. The concept of accessibility, as part of the study of territorial systems, is an analytical tool that allows the expression of

[54] Author's elaboration.

the degree of connection of a point with respect to the surrounding environment, linking the system of activities with the transport. It is, therefore, a property of the urban settlements, that qualifies the local society as a whole and defines the degree of social equity and the quality of life for its citizens (Borlini and Memo, 2011). The individual well-being in the city depends, indeed, on the actual possibilities of accessing, transforming, using and interacting with the elements and processes of the city: the ability to develop the conditions for a right to the city (Lefebvre, 1976, 2014). According to these assumptions, the only presence of quality goods and services is not enough to ensure individual development in the city and its territory, but the effective access to such opportunities must be guaranteed.

In the literature review, several definitions of accessibility can be found, which place the emphasis on the ease or potentiality of use of a given good or service. Among these, it is useful to quote the following:

- "Accessibility can be defined as the potential opportunities for the interaction" (Hansen, 1959);
- "Accessibility is the characteristic or the advantage, inherent in a location with regard to overcoming obstacles due to the spatial separation of activities" (Ingram, 1971);
- "The accessibility denotes the ease with which each spatial activity can be achieved by spatially separate locations, using a given transport system" (Dalvi and Martin, 1976);
- "The accessibility denotes the ease with which any activity can be achieved" (Burns, 1979);
- "The concept of accessibility can be associated with an appreciation of both the quality of transport conditions and the fulfilment of potential destinations with reference to a given need" (Koenig, 1980);
- "The accessibility of a zone can be active, in which case it measures the ease with which the subjects (households and businesses), that are located in that area, can reach the various functions present in the different points of the territory, or passive, in which case it measures the ease with which the productive, commercial and social functions, present in an area, can be accessed by users located in different parts of the territory" (Cascetta, 1998).

The attractiveness of services and their location, therefore, depend on their feature of being easily accessible. The infrastructure and the means, that improve this aspect, can be certainly counted among the factors that

increase the competitiveness of an entire area. Agreeing with Lynch (1981), accessibility can be defined according to who and what constitutes the goal. Accessibility depends not only on the territory (that is the component of opportunities) but also on the various social groups (i.e. the component of skills) and on the reference times and seasons. Hence, accessibility is a basic requirement which is divided into several levels, i.e. physical, temporal and economic accessibility. The physical accessibility indicates the possibility to reach the service, considering the means and devices for mobility which allow its accessibility. The temporal accessibility takes into account the schedule, the times and the multiple functionalities of the equipment. The economic accessibility indicates the possibility of economic access to the service.
In general terms, the accessibility criterion must be addressed taking into account the characteristics of the reference population: for example, a configuration of the public space, which encourages pedestrian movements, with a mix of uses and natural control of space, will facilitate the use of spaces by the elderly and children. In 2003, Harnik claims "a public space is accessible to everyone regardless of residence, physical abilities or financial resources. They should be sited in such a way that every resident is equitably served. Moreover, accessibility should not be based on an idealized healthy adult but rather a senior with a cane, a mother pushing a stroller or an eight-year-old riding a bicycle". Clearly, this definition refers to the concept of spatial equity, that measures the level of distribution of the various public services and spaces in a territory in relation to the different economic, ethnic and political groups and, in particular, to the needs of weak groups (Omer, 2006).
Today, moreover, the accessibility cannot be referred solely to the ease of the movement of people or goods, but also to the ability to access and exchange data, services and information. Consequently, the availability of suitable infrastructure for fast data transfer can be counted among other attractive elements of an area, even if its weight in a decision process of location is lower than the one related to the traditional infrastructures.

6.4.4 Usability

Another essential principle for the services is the assessment of the usability and functionality of space. It indicates the possibility of using a

service whose centrality is always occupied by the user and the satisfaction of his needs.
Its importance also leads to consider the multi-functionality of the areas and the facilities. Consequently, at different times, the same equipment can provide different services. This is a key aspect in order to guarantee the temporal access to the service. In fact, the use of services also depends on the availability of time of the users, which in turn depends on the sex (men, women), age (young and old people) and by employment status (employed and unemployed). This temporal variable has important implications for planning, since, in a given catchment area (which has to be possibly redefined with different criteria from the current ones), the service can be enjoyed in different places and at different times. The predictive technique must, therefore, be recognized.
Another significant aspect is the internal usability of the facility and services closely related to the main function. With regard to the characteristics of the structure, the aspects that must be considered are the dimensional values, the state of preservation (need for maintenance and restructuring) or of conformity with the technical regulations (safety and adequacy of the technological systems). While, for what concerns the mode of use, it is important to highlight the diversification of the function and therefore its degree of flexibility.
From the methodological point of view, the usability can be assessed with interviews and targeted surveys, identifying the so-called known deficiencies, which must be overcome, otherwise, the quality of the service suffers (Comune di Milano, 2012).

6.4.5 Multi-functionality

From a cultural point of view, it is possible to think of using the minimum offer, that is required by the state law, in a more advanced manner. Indeed, through the factors of centralization and transferability of services, there is the possibility of achieving greater utilization of equipment in space and time, by considering the multifunctional aspects. The result is a closer integration with the surroundings and the context, ensuring, moreover, the required accessibility also with telematics (Fasolino and Graziuso, 2014). Today, in fact, one of the urban planning objectives is the integration of functions within cities. This means that different facilities, such as schools, kindergartens and sports equipment are positioned next to one another, or even within the same facility, so as

to allow their users to perform, every day, all the various activities linked between them with efficiency and safety.
The starting point for connecting the functions is to determine the concept of the chain of activities. In spatial terms, this chain can be seen as a network of functional sites, related to an infrastructure that needs to be easily reachable. The integration of functions and facilities, in fact, involves the mix of the functions associated with work and housing in the urban areas, the location of the functions, which must be related to each other and the connection of additional functions, such as, for example, recreational activities for children close to educational centres. Hence, it is spread the need to design buildings and areas where equipment of multifunctional type can be allocated, in which different functions can be lodged in the same space: schools, libraries, centres for social and cultural activities, schools of music and dance, and nurseries.
Moreover, multi-functionality not only produces the beneficial effects of behavioural type, which allows users to be able to enjoy several services at the same place but, also, of temporal and economic type, reducing both the users' time necessary for their movements and the costs associated with the delivery and management of services. Finally, the possibility that different services can be enjoyed simultaneously or deferred throughout different time frames within a building or a land area several can also be the input to the search for new and different ways of their quantitative evaluation.

6.4.6 Security

In the identification of areas and equipment necessary for the emergency management, the recourse to the *flexibility* can be useful. Through it, in fact, there is the possibility of using facilities for two or more purposes, in relation to their capacity of adaptation, depending on ordinary or emergency conditions. So, it is necessary to establish a joint route between regional and urban planning and emergency planning, in order to combine the requirements concerning the areas to be allocated to public parks, car parks or sports facilities, with the ones necessary to deal with the consequences of scenarios of risk to which a given area is exposed, with its population that must be assisted in such spaces. Through the emergency planning, there should be the overlap and the alternation of uses and ordinary functions and the functions of prevention and civil protection, in particular, of emergency management

(Fig. 6.4). So, emergency planning assumes the role of a part of a more complex design, full of environmental quality of urban space (Gerundo and Fasolino, 2010).

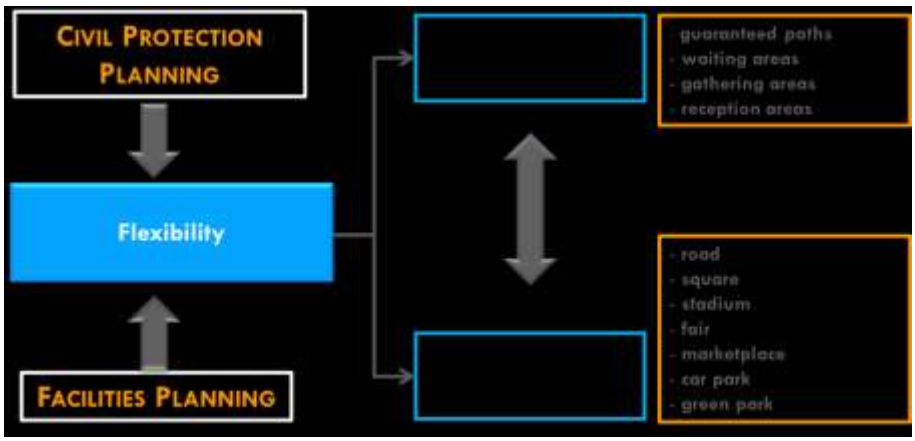


Figure 6.4 Flexibility for integration between Civil Protection Planning and Facilities Planning[55]

For example, an area designed to host cyclically social and business activities (such as local markets, outdoor performances, exhibitions, fun fair, spaces for demonstrations of political parties or associations and car parks), can be equipped with a helipad and self-cleaning cockpit, in order to be also used in case of emergency by the civil protection (Fig. 6.5).
To ensure flexible use of a structure, several peculiar characteristics must be satisfied and defined at the beginning of the designing (Fasolino and Graziuso, 2014). In the light of the principle of flexibility, a facility for sports, a park, or a simple garden will be designed with the following devices (Gerundo and Fasolino, 2010):

- the indications coming from the assessments of the needs of facilities of general interest and urban standards, both in terms of recovery and retraining of new achievements, must be integrated with the needs arising from the emergency plan;

[55] A slide of the author's presentation of the paper *Emergency and public facilities. Verso nuovi standard urbanistici prestazionali* held in Naples at 8th INU Study Day in 2014: Una politica per le città italiane.

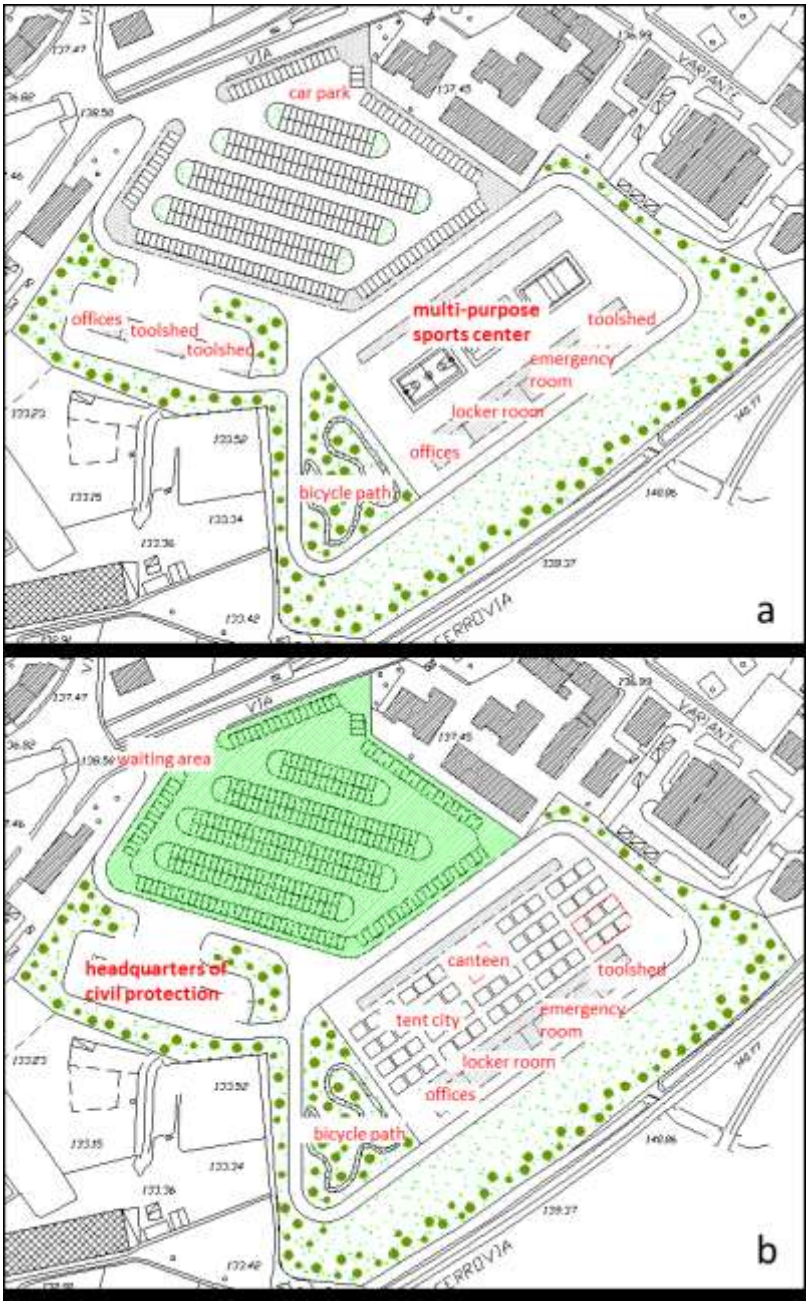


Figure 6.5 Example of flexibility: a.ordinary phase; b.emergency phase[56]

[56] Source Gerundo and Fasolino (2010), modified and translated by the author.

- the location of sites, which are defined in the urban planning, must consider their safety in terms of potential use for functions of assistance to the population in case of disasters;
- the final design has to combine the social and/or territorial needs with functions of the civil protection, incorporating the dimensional indications of the waiting areas, gathering areas for rescuers and areas or structures of hospitality;
- the connections with the area must also be guaranteed in anticipation of a potential event: a quick connection with major technology networks must be forecasted. The connections must be specifically designed with higher levels of security and sized to the catchment area that would arise in the case of an event.

However, the definition of this type of territorial and urban planning operations, interacting in a concrete way with the issue of emergency planning, is difficult, especially if it is compared to the constraints which a specific area would be subjected while waiting for a possible event. An urban project designed for the sole purpose of the civil protection plan, moreover, is binding, limiting the development and, therefore, not compelling the local administrators. Ensuring multiple possibilities of uses of a structure, the realization of equipment which is used occasionally or only for insurance against possible future risks can be avoided. It is necessary that the criteria and the orientations used for the realization of equipment for prevention must be integrated with the ordinary urban planning, and this should be applied especially to the contrary: this means that the ordinary urban planning must never lose sight of the objectives of prevention and emergency (op cit.).

6.4.7 Participation

Through the listening phase, it is possible to achieve the "shared background" (Palermo, 1998) that could lead to the formulation of a collective demand socially produced, shared and recognizable and very local. It is built through a process by which any person may be able to interact. Citizen involvement, indeed, whether in large cities or small towns, helps to create and sustain greater community support for the facilities and services being planned.

While there is little disagreement with the basic premise that the people who are to be affected by a planning policy should have a voice in its determination, opinions vary widely when questions are considered about who should be involved, when and how they should be involved and how much influence they should have on the final plan. The resolution of these questions is essential for establishing a definite policy to encourage citizen participation. It is generally known that citizen involvement adds time and costs to the planning process. Moreover, some feel that public participation is really lobbying by one segment of the population for the special privilege at the expense of the total community and that, when decisions are finally taken, citizen groups are usually disregarded anyway (Goldblatt, 1968).
However, citizen involvement can provide (Fig. 6.6):

- a guide to Policy makers regarding community goals and values: citizens are able to deal with conflicting values and can frequently identify omissions and forgotten factors;
- personal satisfaction through service to the community, by offering the individual an opportunity to serve one's community and contribute to its well-being;
- additional information: the local people, who live the area, can provide additional information which might otherwise be inaccessible or unknown to the planners;
- new ideas or alternatives;
- special expertise: frequently, local people possessing special skills that can be tapped for input to the plan;
- interpretation and implementation: once involved, some citizens will become interpreters and will assume the task of explaining the program and planning objectives to other individuals or groups within the community.

The essence of public participation is the free exchange of ideas. There are many methods and techniques for achieving it, and the merit of each depends at least partly on the amount of two-way communication which is fostered. Planning for public participation requires not only the selection of the appropriate techniques but, also, determining who to involve, scheduling the stages and budgeting for the program (Izzo, 2016).
The real interventions must, in fact, be accompanied by a series of actions with different degrees of inclusion, relating to:

- the information and communication of the plan/project currently under construction, through the creation of graphic identity, a website and a newsletter, the opening of information centres, the activation of committees or thematic discussion groups, and the organization of public meetings to present the project;
- the public consultation in order to understand the lack of services, the improvements to be made and the perception of safety, with different techniques ranging from the opinion poll to formal moments of expression by organized groups;

Figure 6.6 Picture from the Chart of Participation[57]

- the participation of citizens, that can be organized through a variety of techniques, such as local workshops, event site, community maps, which are intended to bring out the identity of the place and the character of the community and to work together to achieve greater cohesion;
- the empowerment, i.e. the implementation of a series of educational and participatory activities that enable the individual and the community to gain self-esteem and take responsibility, to capitalize on

[57] Source: INU (2014), partially modified by the author.

the experience gained through participatory practices and trigger development practices of local, social, cultural, political, economic character. In addition to participating in the process of design of services, leading to defining the negotiation standards, it is necessary also consider the participation in the management phase: some equipment can apply to become places and local governance tools.

Finally, it is important to remember that no one approach is adequate by itself, nor any combination is appropriate for all planning situations and for all their steps. Consequently, the participation has the necessity to be implemented every time, according to the specific situation (ibid.).

6.4.8 Mixité

The mixité is a French term that, related to the planning of services, wants to indicate the presence of mixed services in a given area, in order to ensure greater social security for the attraction of different types of users. The experiences show that some urban models can contribute to the security, thanks to their capacity to generate a high-quality urban environment, able to resist the spread of criminal phenomena. Conversely, some features, such as urban fragmentation, the mono-functional neighbourhoods, isolation and degradation, help to create negative conditions for a secure environment (Fig. 6.7). In such models, the principle of mixité becomes significant for the identification of areas and equipment that contribute to the vitality and social security in a city (Fasolino and Graziuso, 2014).

The mix of uses (whether within a building, a street or an area) can help to determine how well-used a place is, and what economic and social activities it will support. It embodies a search for balance in the continuous oscillation between unity and diversity, between ideal and reality, between collective instances and individual needs. An open composing method is defined, that makes use of the admixture, the variation and declination of the difference, without compromising the unity of the project and the prediction of a valid set, by analogy, from the regional scale to the size of the individual building.

The mixité is a symbol, solution and provision of a good living. It is the expression of an urban condition that, by definition, dealing with functions, alludes to social cohesion and a better morphological environment, against separations, the symbolic barriers, fractures that have crushed the city at the end of the twentieth century. The mixité is

claimed in opposition to modernist functionalism of the 40s-60s, since it legitimates itself as opposed to the functionalist city that separates and distinguishes functions, by reorganizing its spaces. In other words, the target is the practice of zoning, criticized in the name of poverty of the spaces which it entails and, on the contrary, the mixité claims to hold together the diversities. But on closer inspection, it does not act differently from the paradigms that it fights: the functions (and their spaces) are placed side by side, one above the other, and instead of separating and distinguishing them as in traditional zoning, approaches and repositions them in one building or in one block. Despite it may give rise to space infinitely more beautiful than those designed using traditional zoning, however, believing that the mixité also helps to achieve social density, leads to underestimating the fact that the choices and constraints related to the use of space are socially constructed (op cit.).

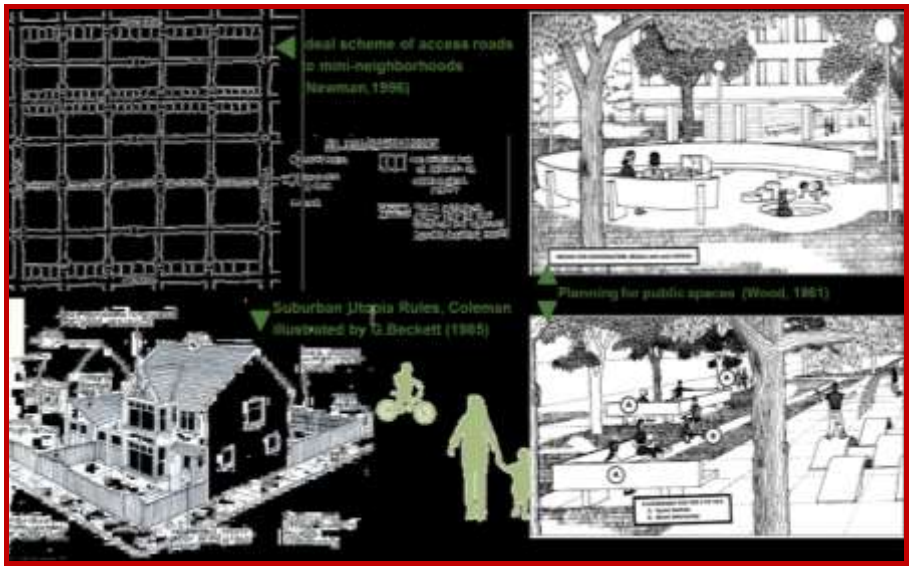


Figure 6.7 Social safety: examples of environmental crime prevention[58]

[58] A slide of the author's presentation of the paper *The quality of spaces and public facilities. Remedies for urban insecurity* held in Arcavata di Rende (Cs) at 36th Conferenza Scientifica AISRe in 2015: *L'Europa e le sue regioni. Disuguaglianze, capitale umano, politiche per la competitività.*

The mixité may be characterized by different aspects and defined with regard to different declinations. It can be typological, functional, social and temporal (ibid.).
The functional and typological mixité showed its strength and usefulness within urban transformation programs of a great substance. The functional mixité constitutes a vital component of urban quality because it guarantees the typical complexity of cities, the fulfilling the needs of the inhabitants, the integration of the communities residing within the district, the enhancement of public space next to the intervention and safety and liveability at all hours of day and night.
To achieve adequate functional mixitè, the design should ensure:

- residences, offices, commercial spaces, cultural and leisure facilities, local and urban services, which are all addressed to the community and the territorial unit of reference;
- a variety of recreational, cultural, social opportunities;
- the design of service/infrastructure of collective interest, such as to provide the public with more places to meet and socialize in order to consolidate the social fabric and facilitate integration;
- a fruition supply organized in segments related to a differentiated demand for expectations, tastes and personal skills, to meet the diverse needs of the community;
- the presence of functions and services of urban and regional interest related to activities to the neighbourhood or to the single residence;
- the territorial distribution of direct functions to citizens, in particular of the commercial activities (placed at ground floors of buildings), of the private and social services (public buildings or public functions, community facilities, sports facilities, community centres, public gardens and fields for sports), so as to facilitate the access for all and with alternative modes of transport to the private one;
- the horizontal and vertical distribution of functions accessory to the residence: local and urban services compatible with residential system (commercial or public services, small production activities, or tertiary, social and cultural services) can be located on the upper floors of buildings;
- the presence of additional services for living: spaces intended exclusively, or primarily, to residents (multi-purpose rooms), which purpose is to make more liveable the residential space and increase

the degree of socialization within the community, stimulating people to organize and collaborate with each other.

Allowing different activities in the same area, vitality increases but, however, this can also lead to conflicts. The activities to predict, therefore, should be analysed in terms of compatibility. For example, activities related to the night-life in a residential area create vitality but, also, conflicts with the residents because of the noise and traffic.

The social mixité emphasizes the will to aggregate, through the proximity of housing, population socially and economically heterogeneous. In fact, through the mix of people of different economic status and social robustness in a place, the long-standing fight against urban segregation (that is a spatial concentration of population belonging to a particular ethnic or social group) can be practised (Friederichs et al., 2003). The dedicated literature (Ostendorf et al., 2001; Bifulco, 2005; Vicari-Haddock, 2005), for a long period, has debated the difficulty in achieving the ambitious objectives related to social mix on the individuals and the community, since, also if it puts various social categories in condition to live side by side, it does not foster necessarily social integration processes.

In addition to the aggregation of the population, it should also be implemented by the policy of presence of a variety of functions. Referring to Arthurson (2005; 2008), and Musterd and Andersson (2005), the supposed positive effects of this solution can be grouped into two broad categories, the one related to the territory and to the neighbourhood, and the other to the interactions among its inhabitants. The first category includes both the expectation to limit or prevent the stigmatization of the neighbourhood processes and the access to services and qualitative infrastructure by disadvantaged social groups that, if segregated, tend to live in areas where services are lacking. The second category refers, instead, to a beneficial influence that the middle and upper classes are expected to have on lower ones, both through socialization processes, providing positive models that can limit behaviours socially disapproved such as delinquency and school drop-out, and through the creation of social networks that vehicle the resources more valuable than those which the lower-middle classes have access. The first category of results depends greatly on the effectiveness of the work of public and private organizations; the second one, that is more ambitious and difficult to achieve in the short to medium term, also requires convergence and cooperation of other stakeholders and, in

particular, of recipients of the intervention, not only in terms of what they must do, but also how they must relate to others and which tolerance they must have for unexpected and unconventional behaviours (Olagnero and Ponzo, 2010).
As regards the temporal mixité, it should be noted that the places and urban areas have established the private or public functions and individual or collective activities, which correspond to a mixture of times, presences of people, men and women of different ages and features. Each function has different hours of operation, calls for specific services and support structures and generates flows of people and things. All this extends the period of activity, creates a complex system of movements and an intense use of the services, thus helping to create a strong vitality and spontaneous control. The plans of the times and schedules offer the possibility of regulating the accessibility to services and save resources to invest in new equipment, through the multiple uses of containers in longer timing. In addition, they could offer analyses necessary to identify the actions that must be taken in order to implement a security policy, that could be based on the offer of the services staggered over time, so as to ensure, in a particular territorial unit, the provision of different services at different times, and on their location, so that the presence of people can assume the meaning of possibility for help and can, for example, discourage a potentially criminal act.

6.4.9 Quality

The quality, as defined by standards recognized in engineering, is "the degree to which a set of inherent characteristics fulfils the requirements" (UNI EN ISO 9000, 2005). The features are the distinctive elements, while the requirements are needs or expectations that may be expressed, generally implied or mandatory. Therefore, the quality of a process depends on how the grade of its constituent elements meets expectations. However, it is clear that expectations are subject to change over time: once a certain level of quality is reached, the search for an even higher quality follows. So the quest for quality is a continuous and never-ending process.

Jill Grant (2006) through the "Planning the good community" has collected a large part of the experiences and theories[59], that have tried to build a satisfactory relationship between extent, sustainability and quality, between social community building and urban model, including economic and political models and shape of the plan (Perrone, 2010). The common themes are the search for a shape and a character for a "good city" (Talen, 2005; Ellis, 2002), an attempt to reconcile the city with nature by improving the social conditions of the inhabitants, manage sprawl and morphological effects of modernity, by regenerating the contemporary city in a new equilibrium with the land that contains it. The new urban approaches retrieve the call to the key values of planning, i.e.: *equity, amenity, efficiency*.

Today, addressing the issue of quality in service planning becomes a challenge for cities, which are forced to develop their own policy and to balance the relationship between costs and resources, working on a real renewal in the field of urban planning. This implies the arise of the need for identification of an overall strategy, and consequently, its actual implementation, for the public space project. By assigning a central role in the planning of services and public spaces of the city necessarily means the need of changes for a more qualitative approach, and then related to the logic of the product (i.e.: in this specific area x, it is necessary to build on the specific service y). So it is possible to replace the logic of the process, starting from the response to the real need (Comune di Milano, 2012).

The basic idea is to re-establish a charge of identity to the system of services, through the recognition and ability to convey meanings even through the physical layout of the public space. The quality of services and the urban quality can be expressed through the architectural quality of the (open and built) public space, its maintenance, its security and reception. It is necessary then to identify indicators to measure the efficiency and effectiveness. This is possible through the research of organizational solutions that are able to contain the growth of spending, trying to ensure, at the same time, sufficient and better services to citizens, and through the creation of forms of cooperation and inter-municipal associations.

[59] They include: the *Neo-traditional town planning or traditional neighbourhood design* (TND) by Andres Duany and Elizabeth Plater-Zyberk; the *Transit oriented design* (TOD) by Peter Calthorpe; the *New design community* by Emily Talen.

However, the qualitative design elements are not expressed through ratios or quantity, so the tendency is to establish minimum conditions of integration among services and relationship with the urban system (Falco, 1993), such as:

- the possibility of integration of a service with the other services;
- definition of the formal characteristics and urban types of the facilities in relation to the territorial context, with the awareness that the services correspond to physical structures, which, sometimes, acquire significant symbolic value in their relationship with other elements of the city;
- finally, the possibility to define through specific agreements with private operators forms of management of certain services that ensure, on the one hand, wide access to facilities and ensure, on the other, acceptable levels of profitability by the operators.

All these design elements are essential for a better territorial organization of its services and the implementation of the characteristics of each equipment.

6.4.10 Sustainability

The new idea of a city, characterized by an innovative nature, unfolds with the promotion of both new services and interventions attentive to energy saving, through the use of innovative materials and renewable energy sources and the use of construction methods according to the principles of sustainability. The World Commission on the Environment and Development (1987) is responsible for crafting the most commonly accepted and widely-used definition of sustainable development: "Sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs". It is a process combining conservation with development, which sets out to meet user's needs at socially and environmentally acceptable costs, and without degrading natural resource flows or depleting resource capital. The central tenet is consensus for a durable permanence. It is also held to be *socially responsible, environmentally harmonious, and economically equitable.*

The application of the principle of sustainability to the equipment, in the first place, emphasizes the integration of all the principles described above, and, secondly, is enhanced by other aspects. For example, the environmental sustainability of urban endowments is linked to the

energy efficiency of buildings and of facilities for public use, to the permeability of the soils of the lots where public facilities and services are located, to the proximity, accessibility and usability of areas for services located in promiscuity with other functions (Arena et al., 2014). In spite of the environmental quality of the city has become an essential requirement of urban living, the costs of implementation and management of equipment are difficult to face with only the public (economic, cultural, technological, procedural) resources. There is also the need that the well-designed facilities should be also feasible: this is the condition for sustainability. Summarising, the implementation procedures taken in the direction of sustainability can be described through the compensatory/equalization system. In addition, the economic and financial sustainability has become, due to the budget cuts, a priority that cannot be separated from processes of consultation with the private sector.

In the search for quality and sustainability, the economic and ethical issues can find a happy synthesis, through the reinforcement of the critical success factors and territorial competitiveness, and, above all, the rise of intangible values and humanistic conception that gives priority to the future, in terms of heritage for new generations.

The concept of identity is strictly connected with sustainability and assumes a fundamental importance for steering innovative policies of urban development, geared towards the quality of living conditions: on the one hand, it is able to put a brake on rampant homogenisation and, on the other hand, it can enhance the existing material and non-material heritage (a repository of cultural values) as regards economic and environmental sustainability. The services will have to be designed, by checking, from time to time, the level of performance that services must offer and in relation to the planning objectives. This means "planning for the site", i.e. reconsidering the specific site, taking into account its social, environmental, functional, morphological and symbolic features (Falco, 1993), according to the full conviction that the guide for innovation and modernity (for being such and durable) must be able to maintain firmly the roots with the places to which it is addressed.

6.5 NEW SERVICES AND THEIR REORGANIZATION

The required types of services are no longer linked to the traditional facilities provided by the law that established the urban standards, as well as the facilities that were sized in the various technical manuals are insufficient, because of new requirements by population. In Table 6.1 the traditional services are listed.
The extension of basic services is the result of a series of socio-economic factors and, especially, reflects new ways of living and new kinds of relationships among the population. For example, its enrichment involves the expansion of the demand for the leisure and entertainment (Bifulco, 2003) but, however, also a social impoverishment (Bauman, 2004), that produces a loss of relationships of family and community and a greater demand for specific equipment for children and the elderly. A further cause of diversification of services is due to changing demographic and labour conditions of the population (older people and immigrants) that force to a diversified and flexible supply (Moraci, 2003). Changing the social order, the competence and role of the public entity also change, leaving room for the action of other private sector operators and ordinary citizens. These considerations on the processes of diversification of services suggest that the basic considered services are increased in number, and that the types of services required by the population are not related uniquely to the physical endowment, site of the service delivery, nor they are forcibly localizable in a physical place (Cáceres et al., 2003; Ricci, 2002). In addition, the use of services is closely related to the availability of time of the users, which in turn depends on their social and economic status.

Table 6.1 Traditional facilities[60]

types	facilities
education	nursery, kindergarten, primary school, secondary school
worship	the parish church, basilica-cathedral, parish house, chapel, convent-monastery, seminar

[60] Author's elaboration.

public interest	archive, basic library, central library, cultural centre, home for the socio-cultural associations
	place of voluntary associations, canteen, community centre and aggregation, civic centre, a centre for children, youth centre, home for the elderly, senior centre, nursing home, a centre for the disabled, community housing (for general discomfort and immigrants)
	doctor, doctor's basic office, pharmacy, public bath
	city hall
	post and telegraph, bank, telecommunications
	commercial activities, market hall, local market and the elementary nucleus of shops, general market, slaughterhouse, milk plant
	indoor playground, indoor sports centre, facility for sports events, race track, swimming pool
green spaces for recreation and sport	agora-square, isolated elementary nucleus, the elementary nucleus of the neighbourhood, neighbourhood park (excluding games), the field for the game, urban park
car parks	for residence, on discovery area, of the area covered and in multi-storey
general interest	high school, university, special schools and specialist training centre, a research centre
	the conference centre, conference room, museum and exhibition centre, cinema, theatre and auditorium, circus-funfair
	socio-medical centre, emergency and first aid, general hospital, health centre and testing laboratories, clinics, orphanage, psychiatric facility, medical centre and geriatric care, nursing home, house-hotel, dormitory, sheltered housing for the disabled and elderly
	the stock market, buildings that host public offices of consulate, province, region, state
	command of the police, command of the traffic police, state police, military barracks, financial police, prison officers, civil defence, fire department, court and judicial office, remand prison
	the shopping centre, hall and exhibition space
	camping, food processing park, inter-municipal and territorial park
	parking of extra-municipal level facilities, passenger interchange, goods interchange
	airport, heliport, port, stations (of bus, train, tram), a warehouse of public transport

plants	service area, repeater-antenna, sewage, landfill, waste incineration plant, walk-in power conversion equipment for mobile telephony and the internet, ecological areas, cemetery, mortuary, plants for the production of alternative energy

The range of services varies in relation to new forms of urban standards: social housing, bicycle paths and pedestrian trails for the slow mobility, use of common goods, micro-grids of naturalness, urban gardens for the environmental system, and many others, as shown in Table 6.2.

Table 6.2 New community facilities and services[61]

class	category	service
residential services	housing	social housing
		temporary housing
		co-housing
		co-operative community housing
for work	in net	virtual offices
	in sharing	coworking spaces
green	ecological and environmental spaces	urban vegetable gardens
		greenways
		social agriculture
		hiking trails and mountain huts
		ecological micro-networks
		ecological networks
mobility	slow	pedestrian paths
		bicycle paths
	in sharing	bike-sharing
		car-sharing
		car-pooling
safety	prevention and emergency facilities	collection or waiting areas
		gathering areas for rescuers
		areas or structures of hospitality or hospitalization
		guaranteed paths
environmental sustainability	energy	production of alternative energy
		e-stations
		wind farms
		solar fields

[61] Author's elaboration.

socialization	for free time	laundry-bar
media	internet	broadband connectivity wi-fi
un-spatial services	social	voluntary associations
		for senior
		for disabled
		for parents and children
	ecological	for the environment
		for the management of networks of services

Today, living the city means new housing policies that allow the access to the house to the most vulnerable categories of people. The *social housing offer*, even the private one, is accomplished by locating the buildings that must be designed in accordance with prescribed types, imposing their position on the market controlled by a very precise demand. This is social housing in rent or property for which are provided easy access mode (Fasolino and Graziuso, 2015). The Italian national legislation has introduced a sense for social housing (*Ers*) as a public service, such as schools, green and other social facilities, for the district and the town[62]. This allows the reserve in urban transformations several designated areas for *Ers*, to be sold to the City for free in return for development rights granted by the plan to the private lands. This new approach creates positive conditions for the *Ers* but, however, does not solve the current emergency situation: indeed, it is insufficient to get for free the area for the *Ers* or insert it in the urban transformation, but it is necessary to finance the construction, with all the difficulties of the current precarious state of the public finances.
They are also spreading other kinds of housing: the *extended house*[63] is a physical and social environment divided into private and semi-private

[62] In this regard, the Law no.244/2007 provides that, in addition to areas to urban standards, the urban plans must define areas whose transformation is subject to the free disposal by the owners, individually or in form of a consortium, of areas or buildings that must be destined for social housing (Ers), in relation to local needs and to the size and value of the transformation. In these areas it is possible to predict, also, any provision of accommodation for regulated, agreed and social rent. Moreover, it is also possible to provide that for the purposes of the implementation of interventions for Ers, aimed at the urban and building renewal, and to the upgrading and improving the environmental quality of settlements, the municipality may allow, in the context of forecasts of the planning instruments, an increase of awarded volume in the limits of maximum increase of the capacity of building provided for the above Ers scopes.
[63] The concept of extended house is not new and the proposal to reduce private domestic space to increase the public one has already had a vast echo in the last century, in which the application

spaces and public spaces where, in an open and flexible way, the various functions of everyday life are distributed. Similar to the extended house is the concept of service-apartment: minimum apartments with large common services[64] (ibid.). These ways of living make it possible to contain the use of a furnished home space per capita and, making the best use of the used equipment, it is possible to reduce the resources consumed per unit of provided service and, therefore, for satisfied user units (Fig. 6.8). Moreover, proposing the development of equipment and spaces for public or semi-public use, these types of housing create new opportunities for socializing and for neighbourhood communities[65]. Freeing the domestic space of certain activities means to dedicate the private space only to most relevant activities to the desire for intimacy, by transferring the other activities in different external units of service with shared use: supplementary services viewed as a set of spaces that, freeing the domestic space, provide access to qualitative services that, on average, are not reached with solutions for individual use[66].
A further consideration regards, for example, the evolution of laundries through their integration with a bar or restaurant[67]. These evolved laundries are the example of how a domestic function partially of technical nature, such as doing the laundry, can be brought out from the private context, offering high qualitative facilities and equipment. They improve the environmental and aesthetic standards of traditional public laundries, by enriching their service and making the laundry itself a place of entertainment and potential socialization (op cit.).
New urban standards reflect new ways of living (Fig. 6.9): new services for mobility, which complement the traditional ones of public transport, with modes such as car sharing, carpooling, collective taxis.

of these ideas occurred, although rarely, under the action of strong ideological pressure and/or pressing needs.

64 A typical example of this trend is Hong Kong, where the most recent construction industry is realized in this way.

65 For example, the shared kindergartens provided in the best practice of Monaco of Bavaria.

66 Numerous instances of extended house: the sharing of kitchens is a common occurrence in many student campus in the world, but, moreover, this solution could be introduced in different living situations, designed for young people, who live alone or people who reside in cities for limited periods of time; shared saunas in Finland and the baths in common in Japan, which are normal in these countries, show that it is possible to imagine the sharing of some places of wellness and body care.

67 For example: *Brain Wash*, San Francisco, *The Laundry Bar*, Miami Beach, *Waschbar*, Linz, *Wasch Bar*, Hamburg, *The Laundry Café*, London, *Holly's*, Berlin.

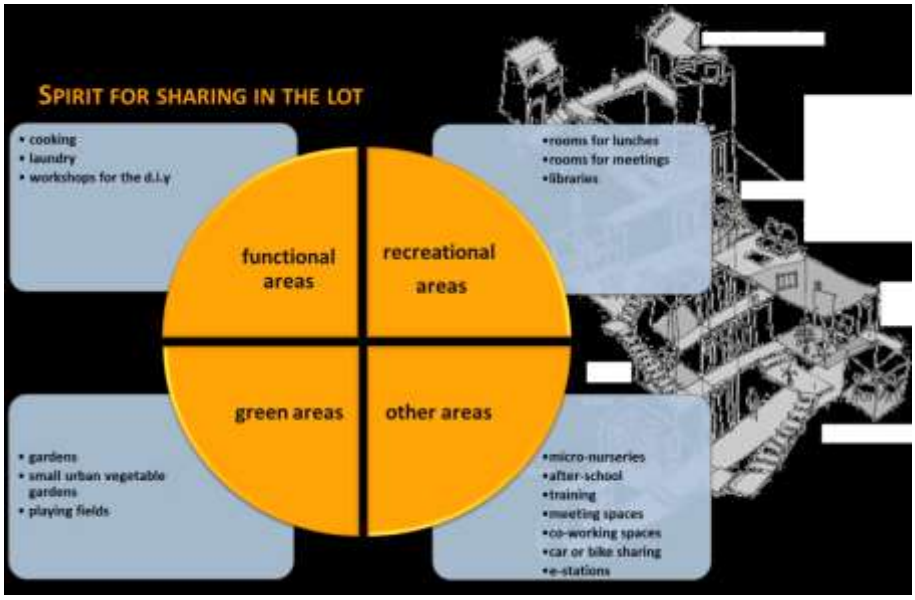


Figure 6.8 Additional facilities and services[68]

Over the last few years, moreover, other examples of defining new urban standards can be found, and in many cases, they are treated as primary infrastructure works, such as the electronic ultra-wideband communications networks (DI no.133/2014).
Among the activities that require dedicated surfaces, there are also the facilities for emergency management and rescue of populations affected by disasters resulting from the risks. These areas are considered such as new types of standards that, on the occasion of the repeated disasters that affect the Italian country, are an essential element to be integrated into urban planning (Cáceres et al., 2003).
A theory, extremely widespread and shared, considers and treats the natural system as a new town infrastructure that must be planned carefully, to regulate and manage it effectively, to use as a tool of government land, to preserve and to maintain consistently and continuity in good condition. In this context, there is the need to protect the integrity of natural resources recognizing the green as the ecological system. New articulations of the environmental system appear, which

[68] A slide of the author's presentation of the paper *Standard urbanistici innovativi. Connessioni prestazionali per la qualità urbana* held in Naples at 9th INU Study Day in 2015: *Green and Blue Infrastructures, Virtual, Cultural and Social Networks.*

tend to blur the difference between public and private destinations, on which the control method of urban planning based on the quality standard has been set: territorial parks/protected areas, agricultural areas, urban parks, public green of neighbourhood, private green spaces, private areas free of relevance for housing. Also, the practice of social agriculture is emerging, which is founded on the combination of two distinct concepts: multifunctional agriculture and the social services/therapeutic-care locally. Through the production of agricultural products, this new factor is contributing, to the welfare and social inclusion of people with special needs (op cit.).

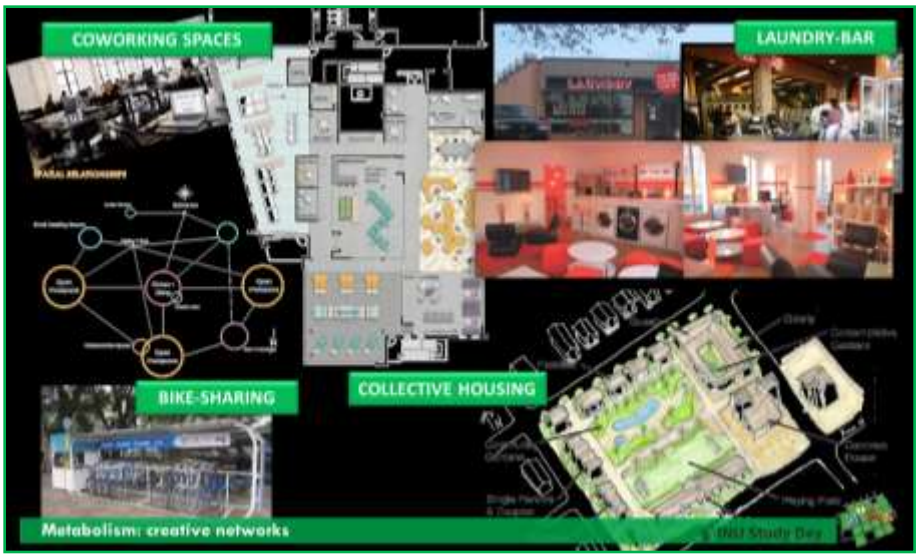


Figure 6.9 New services and new ways of living[69]

In conclusion, the issue of services, in the strict sense, have joined other themes: the centrality of the places to meet and socialize, the network of walking and cycling routes, the presence of neighbourhood businesses. It can be also reiterated that the inherent dynamism to the needs expressed by the community must necessarily be subject to monitoring, in order to have always a real and verifiable framework. Downstream of the definition of the framework of the needs and objectives, the contribution

[69] A slide of the author's presentation of the paper *Standard urbanistici innovativi. Connessioni prestazionali per la qualità urbana* held in Naples at 9th INU Study Day in 2015: *Green and Blue Infrastructures, Virtual, Cultural and Social Networks.*

of private citizens can be defined. With their initiatives, indeed, it is possible to contribute to a concrete redevelopment of the city.

6.6 CHAPTER SUMMARY

From a tool of abstract quantitative implementation, the urban standard becomes a parameter or a tool for providing a rational and comprehensive solution to the needs of quality. In this chapter, an innovative approach has been pursued, according to the fact that urban standards cannot be separated from the places and their geographical distribution, in relation to different symbolic, environmental, physical and economic features of a territory, as well as the demographic and social evolution. Moreover, the chapter is mainly focused on the definition of the basic principles for an innovative planning of services, which must be reorganized in relation to the answers they give to new ways of living and working.
Aside from this considerations, the issue of services location will be treated in chapter seven, where the different theoretical model will be studied, with the aim at being integrated into the methodological proposal in chapter eight.

7 MODELS, TECHNIQUES AND TOOLS

"…
what is not expressly prohibited is permitted".
(Lr Lombardia no.01/2001)

Planning an efficient service distribution that facilitates access to jobs, education, health and social services would be factors to increase "spatial justice" (Soja, 2010). An efficient policy-planning strategy for services, indeed, would provide equity in accessibility and reduce overcrowding, contributing to increased spatial justice. Consequently, advantages and disadvantages, efficiency, type of activity and characteristics of the population are included in the decision process about location.
After an introduction to the general problems of location, this chapter, structured according to Figure 7.1, describes several instruments and models, deriving from different disciplines, which might be used for the methodological proposal of this research.

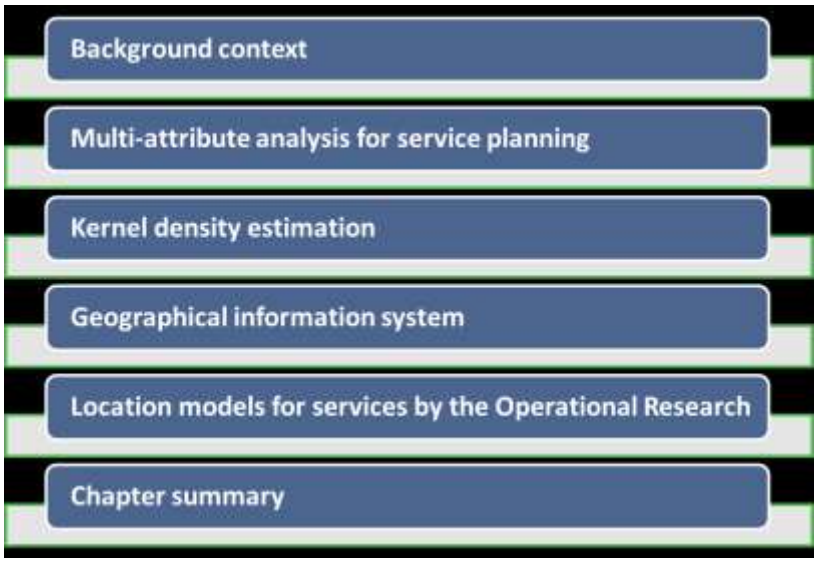


Figure 7.1 Chapter 7 diagram

7.1 BACKGROUND CONTEXT

Urban planning concerns the design and organization of urban morphological space and socioeconomic measures that can be undertaken to solve problems in the use of the land. The strong demand for innovation of the traditional methods and tools, which can be adapted to the multidimensional and multidisciplinary nature of the territorial systems, suggests an integrated and dynamic planning, generally through the interaction among design, management and evaluation (Cecchini et al., 2005). The general objective is usually to provide decisions about the land use of activities or urban space which should be better than the existing pattern without planning (Hall, 1975). This aim is usually achieved by using knowledge and creativity to design, evaluate and implement a set of justified actions in the public domain (Friedman, 1987), and the knowledge, possessed by a number of actors, may be scientific and experimental, implicit and explicit, technical and social.

Many public sector activities occur at specific locations in urban areas, and many of them are fixed in particular locations for long periods of time. Examples abound: major transportation nodes (such as train stations, airports, or harbour facilities), city parks, schools, museums, hospitals, and government administrative buildings are frequently kept in fixed locations for decades at a time or even longer. Clearly, it is often of value to firms or individuals to be located in close proximity to such facilities because it is necessary or desirable to take advantage of the services that they provide. Indeed, the most casual observation suggests that the location of public facilities can have a substantial impact on private sector locational choices. This raises issues that are of importance both for positive economics and for policy evaluation (Fujita and Thisse, 1986). From the viewpoint of the positive economics of urban spatial structure, it is natural to conjecture that the presence of a public facility would serve as an agglomeration point for private economic activity, leading to the clustering of firms and households around the facility. But locational problems inherently involve strategic interdependence, making them notoriously difficult to analyse. Moreover, the effect of public facility location on private sector behaviour is also important from the normative viewpoint. Indeed, the location of a public facility is itself a policy decision and one which is often of intense interest to at least some parties – landowners, developers and persons interested in public

investment. As a consequence, it is necessary to understand the effect of the policy on private sector behaviour if one is to develop a comprehensive accounting of its social benefits and costs. In the present instance, it is apparent that a proper analysis of the implications of public facility location requires consideration of the effect of this decision on the spatial structure in an urban area. Moreover, since the presence of public facilities may influence the nature of the spatial structure in an urban area, they may also influence the evaluation of other politics whose impact is likely to be sensitive to this structure.

Regarding the design and location of services, the following aspects should be considered (Leonardi, 1981):

- a single decision-maker, typically public, which controls the spatial distribution of the service (in terms of location and sizing);
- a demand made by a category of users, hypothesizing that it moves from a place to another on its own account, in order to go to places where the service is supplied;
- a criterion of evaluation of the spatial distribution of the service, which, in general, is based on measures able to benefit the users;
- several costs associated with the installation and the management of facilities and the constraints of available budget and of minimum or maximum size of the unit of service provision.

From the literature review it is possible to recognize the existence of different approaches, for which researchers have tried very often to unify them, in order to fill all the deficits: for example, the optimum location by the Operational Research, which is characterized by a high degree of algorithmic sophistication and accuracy with regard to the issue of supply constraints (Balinski, 1961; Efroymson and Ray, 1966; Erlenkotter, 1978 Wolsey, 1983), or the models developed in the context of Economics, marked by economic and behavioural assumptions for the demand (Harris, 1964; Lakshmanan and Hansen, 1965; Huff, 1966; Coelho and Wilson, 1976; Hodgson, 1978; Leonardi, 1978).

The idea of using mathematical models, understood as abstract structures reality through can be described, is based on the belief that it is possible to face the decisional problems by thinking in a structured manner, by exploiting and organizing most of the available information, by acquiring, at the same time, new information and, above all, identifying possible solutions (Ricca, 2008). Moreover, by exploiting the potential of computers and the highly efficient software that can now

solve a very complex model in a short time, it is possible to take advantages of the repeated resolution of the same pattern, varying the initial conditions also depending on the results previously obtained.
This solves also the problem of the static nature of several mathematical models, which often must describe a dynamic reality. Finally, it is clear that the mathematical tools are well suited to the systematic and orderly collection of information, which can be acquired during the decision-making process, thus promoting an ideal route for the traceability of decision.
In this research, the formal basis for planning and locating innovative services is based on an integrated approach (Tab. 7.1) among the multi-attribute analysis (*AMA*), the kernel density estimation function (*KDE*), the principles of linear programming (*LP*) by the Operational Research (*OR*), and the computer tool of the geographic information system (*GIS*). They are models and tools where all the introduced concepts in the definition of the problem are translated first in mathematical elements or functions and transferred subsequently in reality through the project.

Table 7.1 Tools for location of services[70]

Functions	Input	Output
MULTI-ATTRIBUTE ANALYSIS	finite no. of parameters	qualitative and quantitative indicators
SET COVERING (O.R.)	variables and constraints	minimum no. of services
KERNEL DENSITY ESTIMATION (KDE)	parameters	gravitational catchment areas
GIS ENVIRONMENT	factor maps	suitability maps

7.2 MULTI-ATTRIBUTE ANALYSIS FOR SERVICE PLANNING

A methodology which has most contributed to systematize and order the decision-making processes in the public scope is surely the multi-attribute analysis which, originated from a critical review of the classical

[70] Author's elaboration.

costs-benefits analysis, has developed independently through a complex procedure able to address the various problems related to choices. (Rosato, 1998). The multi-attribute analysis includes a set of methods for evaluating and choosing different designing alternatives, in which it is possible to take into account explicitly the multiplicity of dimensions of the decision problem. The input is constituted by a finite number of alternatives, among which it is necessary to identify a scale of preference in order to arrive at the choice of the most satisfactory solution in respect of the general objective.

Although various methods of multi-criteria evaluation exist, it is possible to identify several common features, such as, for example, the need to define targets and criteria, to assign weights to the criteria, to build an evaluation matrix and to conduct an analysis of the sensitivity of the results.

The first step in the application of a multi-criteria assessment method is, in fact, the construction of the evaluation matrix, in which columns are filled by the options included in the evaluation and the rows are made by the evaluation criteria. Each element of the matrix represents the effects of a given option with respect to a criterion.

Defined a certain scale of preference, the next step is the allocation of a numerical score to each component of the matrix. In this way, it is possible to homogenize information of different nature, expressed with reference to different (quantitative and qualitative) rating scales. Also, it must be taking into account that sometimes a number in absolute value greater than another, associated with a certain indicator, indicates a better behaviour of an option with respect to another and that, instead, in other cases, it may be worth the vice versa.

The next step is represented by the phase of assigning weights to all evaluation criteria. The allocation of weights is an operation of hierarchy that allows the definition of an order of importance among the various criteria and/or sub-criteria and, consequently, it is possible to build a priority matrix. This means that a numerical value is assigned to each criterion, thus expressing its relative importance compared to the other. Also, in this case, it is possible to use the interval between *0* and *1*, where the sum of all the weights assigned to the criteria is precisely equal to *1* and where the greater value recognized to a criterion represents the major importance of the criterion itself with respect to the others. To get an order of preference it is possible to combine the scores attributed to each option for each criterion and the weights assigned to the criteria

through compensatory techniques, according to which a low score obtained by a proposal with respect to a criterion may be offset by a high score reported by the same option over another index. The ability to assign weights to the criteria and join their scores is possible under the hypothesis of mutual independence of preferences. This means to assume that the preference for a certain alternative compared to an indicator is independent of the preference for the same option compared to another criterion. There are many techniques of assignment of weights: the direct assignment and the pairwise comparison are more used than the other ones. The pairwise comparison is an interesting technique, through which elements of a certain level are compared in a pair in relation to elements of upper levels: the criteria are compared between themselves in reference to the overall objective, the sub-criteria in reference to the related criteria, and finally the alternatives are compared to the sub-criteria.
From this comparison, it is possible to establish the degree of importance of an element respect another, both belonging to the same level. The result of the comparison is then a coefficient a_{ij}, named dominance coefficient, which represents an estimate of the dominance of the first element (i) compared to the second (j). The multi-criteria analysis is strongly influenced by uncertainty and subjectivity: every aspect of the analysis is evaluated differently by decision makers since they often have different interests or points of views. To test the stability of the solution, an analysis of sensitivity is required. It consists of an investigation into the decision-making results to assess what variations in the model can generate substantial differences in the scale of priorities of planning alternatives. There are three main types of analysis of sensitivity, based on the method, the criteria and the weights. The latter is the most applied and by varying the weights of the criteria it is possible to assess the degree of influence of each criterion on the final decision.

7.3 KERNEL DENSITY ESTIMATION

The Point Pattern Analysis is a family of spatial analysis techniques developed, starting from the first principle of geography by Tobler (1970): "All things are related, but nearby things are more related than distant things", and implemented by Bailey e Gatrell (1995) in their

studies for the spread of epidemics. It encompasses a variety of methods to analyse and describe the spatial pattern of specific events in a territory (O'Sullivan and Unwin, 2003). That is, for a given phenomenon, it studies how certain events are distributed throughout a region and, from sources of punctual vector data, there is the generation of grids, that are classified on the basis of associated numerical attributes (Las Casas et al., 2005). The method, to which reference is made, is based on the density, and, in the presence of heterogeneous distributions of points, the focus shifts to the calculation of the local density.
The technique used is the Kernel Density Estimation. This density is estimated by counting the number of events in a region, said kernel, centred at the point where it is preferred to have the estimate. It is necessary, therefore, that each L_i event is uniquely identified in space by the coordinates x_i, y_i. Accordingly, an event L_i is a function of the position and the attributes that characterize it. While the simple density function examines the number of events for each element of the regular grid that composes the *R* study region, the kernel density considers a movable surface in three dimensions, which weighs the events according to their distance from the point of which the intensity is estimated (Gatrell et al., 1995).
The density or intensity $\lambda\ (L)$ of the distribution at the point *L* can be defined by the equation:

$$\lambda(L) = \sum_{i=1}^{n} \frac{1}{\tau^2} k\left(\frac{L-L_i}{\tau}\right) \qquad [7.1]$$

Where L_i is the *i-th* event, $k\ ()$ is the kernel function, which weighs the events according to their distance from the point of which it is estimated, and τ is the bandwidth, i.e. the radius of the circle centred at *L* within which the events contribute to the estimate (Fig. 7.2). The choice of the bandwidth affects greatly the resulting surface of estimated density. If the bandwidth is high, the kernel density is considerably closer to or coincides with the values of the simple density. If the bandwidth is rather small, the resulting surface will tend to catch single events, with near-zero density for elements of the grid that are far from each event. The bandwidth must be evaluated according to the phenomenon that must be analysed and determined for subsequent adjustments.

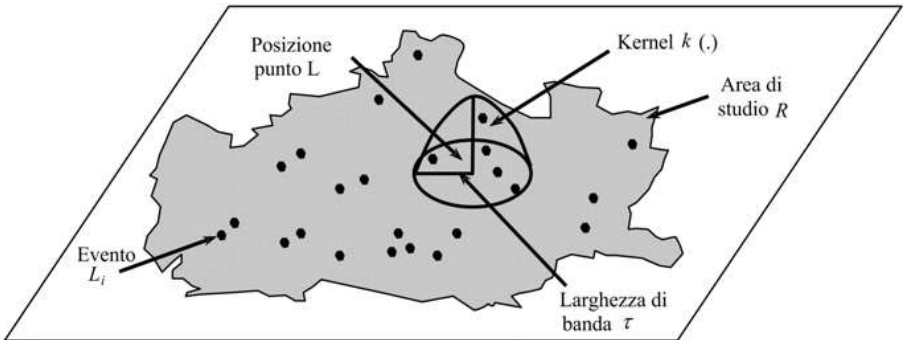


Figure 7.2 Kernel Density Estimation (modified by Bailey and Gatrell, 1995)

The integration of Kernel Density Estimation in a *GIS* environment allows producing raster maps as a function of the attributes associated with geometric primitives, that are representative of the designed pattern. (Gerundo and Grimaldi, 2009).

7.4 GEOGRAPHICAL INFORMATION SYSTEM

The use of Geographic Information Systems (*GIS*) in public planning and management has proliferated over the past three decades, also with its adoption within the field of services. Among the first applications, Wicks et al. (1993) offered an example of its use for park marketing, management and planning. The *GISs* are effective tools used for studying the territorial systems and focused on handling knowledge and managing a considerable amount of information. This information, in addition to having a quantitative and/or intrinsic qualitative definition, is also placed spatially, with respect to a unified reference system and, therefore, the *GIS* can be seen as a form of Database Management System (*DBMS*). In general terms, the goals of the *GIS* are the research and analysis, such as creating models, simulating trends and presenting scenarios, along with the visualization of results through maps, three-dimensional views, and other multimedia representations.
For its features, the *GIS* is also a Planning Support System (*PSS*). With this acronym, it is possible to indicate a subset of geo-information technologies, dedicated to supporting those involved in planning, exploring, representing, analysing, visualizing, predicting, prescribing,

designing, implementing, monitoring and discussing issues that are associated with the planning objectives (Batty, 1995).
In fact, *PSS* is a term that refers to the diversity of geo-technological tools, which are primarily developed to support planning processes both in terms of derivation and evaluation of future alternatives. Kim (2004) defines *PSS* as "computer aided planning system combining geographic information system (*GIS*), urban models, and visualization tools, has been actively researched and applied in many developed countries". One of the basic assumptions in *PSS* is that an increase in access to relevant information will lead to a greater number of alternative scenarios, and thus a better informed public debate. *PSS* should also incorporate planning tools such as economic and population analysis and forecasting, environmental, land use and transportation modelling. In addition, *PSS* should include other relevant technologies allowing for handling both quantitative and qualitative data to facilitate public participation and group interaction (Harris, 1989; Bishop, 1998; Klosterman, 2001).
Current *GIS* software has substantially evolved to integrate different geographic data formats in a better way, and this has been an important step for the practical need of planners that usually have to cope with data coming from several scientific fields, sources and authorities. The data model of a GIS must be able to represent the different forms of the physical world and be flexible enough to adapt to the possible combinations found in the reality. The data implemented in a *GIS*, using a relational database, can be: geometric data, for the cartographic representation of the shape of objects and their size and geographical position; topological data, concerning the mutual spatial relationships among the different geometric objects within a given space; and alphanumeric data, that are descriptive of the characteristics of objects through a set of attributes (numbers and texts) associated with each element. The *GIS* systems are compatible with many types and structures of data coming from different sources and capable of integrating them with each other.
Since 1993, the ease of implementing and using *GIS* has improved significantly. Great advances have been made in both the number and power of capabilities provided as standard functions in *GIS* packages and the amount of easily available data, much of it downloadable over the Internet has increased. These improvements have enabled the development of more sophisticated analytical applications, including many that are pertinent to researchers and professionals in the field of

services. In addition, better results by *GIS* are obtained by the fusion of *CAD* and *DBMS*, which allowed overcoming the limitations of traditional cartographic representations. Through this integration, it is possible to have the complete knowledge of all the information related to geographic features and their geometric nature, above all for their total information content. Finally, other integrations are the web-based applications, which are the most relevant to these technologies for their potential of being published and distributed by web-*GIS* sources like Google maps.

7.5 LOCATION MODELS FOR SERVICES BY THE OPERATIONAL RESEARCH

The issue of public facility location is strictly connected to political decisions on public spending, in response to a social welfare criterion in a mixed market/non-market setting. In contrast, a private sector location theory emphasizes individual choice, and utility- or profit-maximizing in a predominantly market context (Teitz, 1968: 37-38). As a consequence of the public dimension, public facility location theory is not likely to be solely concerned with locational efficiency. Instead, as Teitz emphasizes, such questions as the distributive impacts of the facility system and the influence of the political dimension on public decisions will be of paramount importance. In addition, the theoretical problem is complicated by the need to consider the dynamic interactions within multiple-facility systems.

Operational Research (*OR*), with its techniques and its formal setting, is one of the central disciplines of mathematics applied to decision-making problems. It studies how it is possible to make an efficient use of the resources that are available, taking into account that they are generally limited and expensive. This discipline arises then as a support tool for any decisional problem: in fact, mathematical models and methods are often proposed as tools of comparison for those who have decision-making responsibilities in the organization and management of complex systems.

Its contribution consists in the introduction of the so-called *optimal model approach* for the solution of a decision problem. According to this approach, the analysis of a real problem is organized in two stages:

- the representation of the problem using a *mathematical model* that abstracts the essential aspects and which systematises the interrelationship among the different aspects of the phenomenon being studied;
- the development of *efficient mathematical methods* (algorithms of solution) to determine an optimal solution of the problem or a good approximation.

The application of this discipline is divided into five phases:

1. definition of the goals that must be achieved;
2. collection of the information necessary to achieve the set objectives;
3. creation of a mathematical model, that is, a translation into a mathematical form of the problem;
4. resolution of the mathematical functions expressed in the model;
5. verification that the obtained solutions are acceptable and compatible with the actual situation.

In order to create properly a mathematical optimal model representing a particular phenomenon, obviously, it is necessary to identify the significant parameters of control and a criterion for evaluating the quality of the solution. The determination of the model is a complex and incompletely formalized activity, which must have recourse, on the one hand, to a thorough understanding of the characteristics of the problem at issue and, on the other hand, to tools that come from different branches of mathematics. Once determined the correct model, the *OR* deals with the provision of an explicit procedure for determining a solution to a problem. This procedure may be represented by analytical and mathematical methods or, as it happens more often, by numerical methods that determine the solution of the problem through specific algorithms. Consequently, the *OR* is typically an interdisciplinary methodology, applicable in many different contexts and one of the main reasons for its current vitality derives from the stimuli precisely coming from very different topics.

Regarding the planning of services, identified the problem of localization, and therefore the objectives to be pursued and the constraints that must be considered, it is necessary to formulate and construct a suitable mathematical model and choose the solution method (algorithm) for the determination of one or more solutions.

The classic models introduced by Hakimi in the 60s are known as models of *p-median* and models of *p-center*. Through these models, it is possible to define a localization of services, with the purpose of

optimizing an objective function, which depends on the distance that users must travel to use the service. In these models, it is assumed that the service demand is originated on the nodes of a network, such that each node is considered as a user or an aggregate of users which must be served. The service points are also located on the nodes of the network. To avail of the service, the users, who are spread throughout the territory, move to the point where such a service is provided. The cost of this displacement (generally, the travel time or a generalized measure of cost) is the cost that the user pays for the service. These models decide where a fixed p number of service centres must be located, in order to minimize a total cost, that depends on the displacement. In particular, the p-median models and those of localization of installations minimize the sum of the total costs of displacement (models of min-sum type), instead, the p-center models minimize the maximum distance of a user from the nearest point of service (min-max models). It can be also stressed the fact that the goal of some location problems does not correspond to the minimization of the managerial costs, but rather to the optimization of a qualitative index of service.

Currently, *OR* identifies the following location models:

- *set covering* (*SC*), which identifies the least number of stations, and their location, so that each region of demand is covered. This means that each region is served by at least one station within a predetermined time, i.e. the covering threshold. This model is usually used, for example, for the localization of the fire brigade stations or Automated Teller Machines (ATMs);
- *set partitioning* (*SPAR*), which locates the number of stations in such a way that each of the regions of demand is served exactly by one station: an example is the electoral regional division;
- *set packing* (*SPAC*), which locates the number of stations in such a way that each is contained in at most one region, and it is defined for example for the selection of groups.

Given a finite set $M=\{1,...,m\}$, being S, a (not necessarily complete) set of the subsets of M, and a set $F=\{F_1, F_2, \ldots, F_n\}$ of sub-sets of M such that $F \subseteq S$:

- the set F is called Covering of M if $\cup_i F_i = M$;
- the set F is called Packing of M if $F_i \cap F_j = \emptyset$, $\forall F_i, F_j \in F$;
- The set F is called Partitioning of M if F is both a covering and a packing of M.

The description of the set covering model follows in general form and, starting with it, then it is possible to obtain the general form of the other two models.
Given a set $M=\{1,...,m\}$, i.e. a set of areas to be served, and a family of subsets of M given by $F_1, F_2, \ldots, F_n$ (the subsets of areas that each service is able to serve), it is possible to define a matrix of coefficients (A) which allows the representation of different subsets with reference to the elements of M that belong to it. The generic a_{ij} element of the matrix is defined as follows:

$$a_{ij} = \begin{cases} 1 & \text{if the element } i \in F_j \\ 0 & \text{otherwise} \end{cases} \qquad [7.2]$$

with $i= 1, 2,..., m$, and $j= 1, 2,\ldots, n$.
If the i element belongs to F_j means that the F_j choice covers the i element.
Introducing the following variables of binary choice

$$x_j = \begin{cases} 1 & \text{if the subset } j \text{ is chosen} \\ 0 & \text{otherwise} \end{cases} \qquad [7.2]$$

for $j= 1, 2,\ldots, n$, the constraint

$$\sum_{j=1}^{n} a_{ij} x_j \geq 1 \qquad [7.3]$$

ensures that the i object is included in at least one of the selected subsets. Moreover, pointing to c_j the cost of the F_j, subset, it is possible to formulate, in general form, the set covering model that allows covering all of M objects by minimizing the total spending.

$$\min \sum_{j=1}^{n} c_j x_j \qquad [7.4]$$

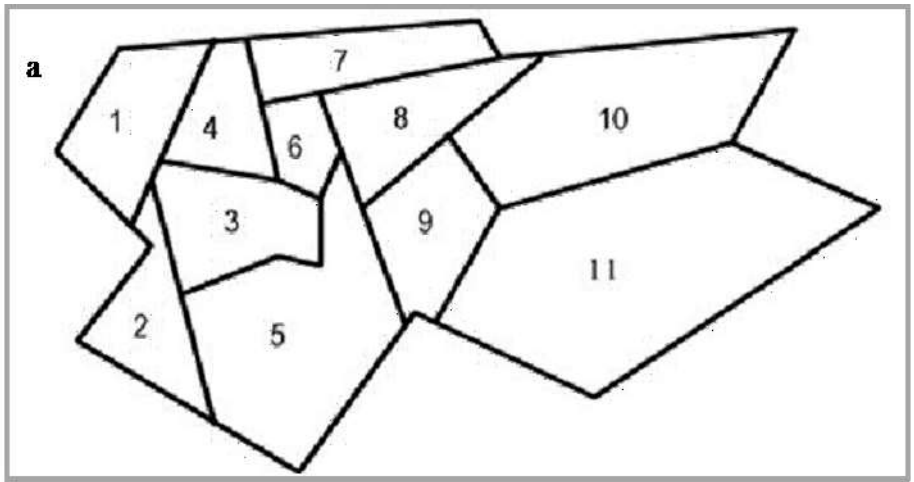
$$\sum_{j=1}^{n} a_{ij} x_j \geq 1 \qquad i = 1,\ldots, m \qquad [7.5]$$

$$x_j \in \{0,1\} \qquad j = 1,\ldots, n \qquad [7.6]$$

The classic examples of the application of set covering are the activation of new services (the location of the fire brigade stations) or their implementation (the opening of ATMs).
In the first case, for example, in a territory divided into eleven zones (Fig. 7.3a), the problem is to open the minimum possible number of stations, but in such a way as to ensure that each zone is served by at least one station. The types of variables are:

$$x_j = \begin{cases} 1 & \text{if in a zone j a station will be opened} \\ 0 & \text{otherwise} \end{cases} \qquad [7.7]$$

for *j= 1, 2,…, 11*.
The constraints of the problem are due to the fact that it is necessary to ensure an efficient service for residents without opening a station in each zone. It is possible to hypothesize, therefore, that a station is able to serve, in a few time, the zone in which the station is located, and also all those immediately adjacent. Moreover, if there are also c_j costs associated with the opening of stations in different areas, the model can be summarized as shown in Figure 7.3b.
An example of implementation of services is related to the location of ATM in correspondence of some branches of the same bank distributed over a territory (Fig. 7.4a). Hypothesizing that the cost of opening the ATM is the same for all branches, the set covering problem is to decide in which branches it is necessary to locate the ATM to ensure the whole territory coverage. The constraints are identified by the fact that, depending on the size of the zones in which the region has been divided, a new ATM in a given area can serve (cover) the customers of that area and the customers of adjacent areas (Fig. 7.4b). To find the optimal solution, it is necessary to formulate and solve a set covering model with 24 constraints (as many as the areas that comprise the territory) and 10 variables (as many as the possible branches).



b

	zones										
	1	2	3	4	5	6	7	8	9	10	11
Cost of location	c_1	c_2	c_3	c_4	c_5	c_6	c_7	c_8	c_9	c_{10}	c_{11}

$$min\ c_1x_1 + c_2x_2 + c_3x_3 + c_4x_4 + c_5x_5 + c_6x_6 + c_7x_7 + c_8x_8 + c_9x_9 + c_{10}x_{10} + c_{11}x_{11}$$

$$\begin{array}{lllllllllll}
x_1 & +x_2 & +x_3 & +x_4 & & & & & & & \geq 1 \\
x_1 & +x_2 & +x_3 & & +x_5 & & & & & & \geq 1 \\
x_1 & +x_2 & +x_3 & +x_4 & +x_5 & +x_6 & & & & & \geq 1 \\
x_1 & & +x_3 & +x_4 & & +x_6 & +x_7 & & & & \geq 1 \\
 & +x_2 & +x_3 & & +x_5 & +x_6 & & +x_8 & +x_9 & & \geq 1 \\
 & & +x_3 & +x_4 & +x_5 & +x_6 & +x_7 & & & & \geq 1 \\
 & & & +x_4 & & +x_6 & +x_7 & & & & \geq 1 \\
 & & & & +x_5 & +x_6 & +x_7 & & +x_9 & +x_{10} & \geq 1 \\
 & & & & +x_5 & & & & +x_9 & +x_{10} & +x_{11} \geq 1 \\
 & & & & & & & & +x_9 & +x_{10} & +x_{11} \geq 1 \\
 & & & & & & & & +x_9 & +x_{10} & +x_{11} \geq 1
\end{array}$$

$$x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10}, x_{11} \in \{0,1\}$$

Figure 7.3 Localization of new services: a. territorial division; b. formulation of the problem[71]

A feasible solution for the problem of ATMs localization is one that selects the subset of branches {1, 2, 5, 6}, as showed in Figure 7.4c. The areas covered by the positions 1 and 6 are shown in grey, while the areas

[71] Source Ricca (2008), assembled and translated by the author.

covered by the 2 and 5 positions are indicated with diagonal lines. The grey and striped areas are served (covered), instead, twice.

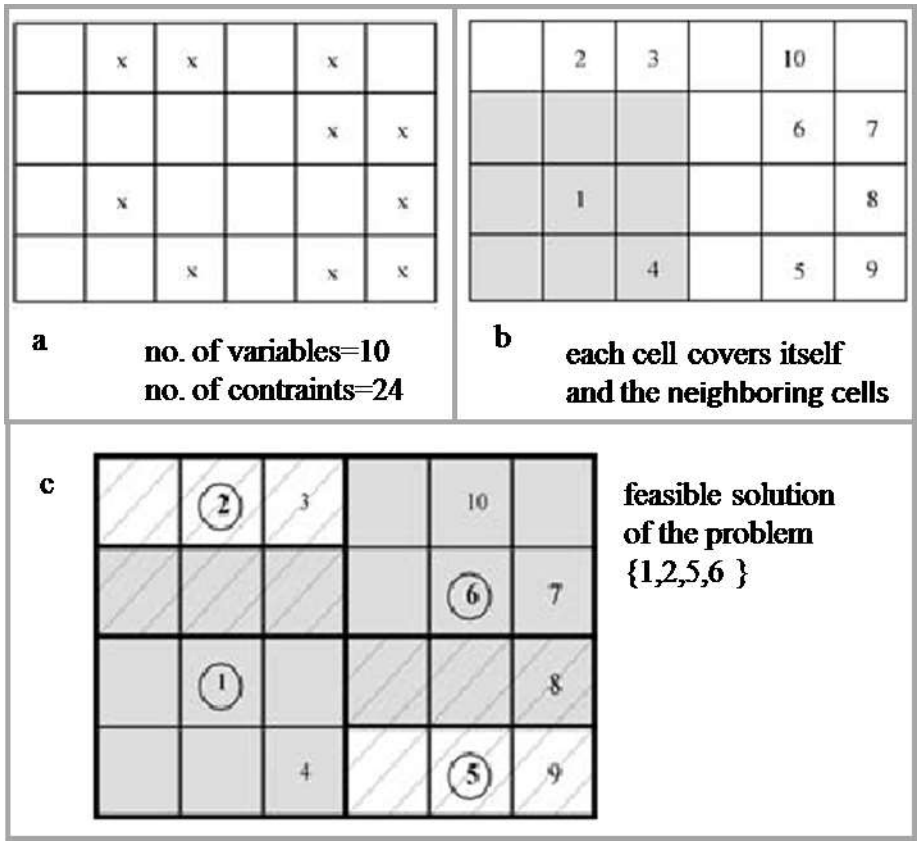


Figure 7.4 Implementation of services: a. territorial division and variables; b. the coverage constraints; c. a feasible solution[72]

In the localization of services, the targets that must be considered are, therefore, the minimizing of costs, not only understood as manufacturing and management costs, but also as costs in terms of distance that users are willing to travel, and the maximum usefulness that the service may have. For this reason, it is, therefore, necessary to control continuously the adhesion between model and reality, since important relationships may have been overlooked or certain variables used by the model may have been assessed incorrectly. If the solution is

[72] Source Ricca (2008), assembled and translated by the author.

to be used repeatedly, it is better to continue to examine repeatedly the model and the corresponding solution to ensure that they remain valid in time, since, if the real conditions are in flux, several changes may occur and invalidate the same model.

7.6 CHAPTER SUMMARY

Chapter 7 accurately reflects on the mathematical models in order to analyse and evaluate the community facilities and the urban tissue and defines the operative tools which might be useful in the methodological proposal for planning services. The identified tools have been: the multi-attribute analysis, the kernel density estimation, the geographical information system and the set covering model.
All the defined instruments will be used, in an integrated manner, in the methodology for planning the urban standards, that will be explained in the following chapter eight.

8 METHODOLOGY OF URBAN VERIFICATION, DESIGN, PROJECT AND PLANNING

> "… Each city receives its form from the desert it opposes;…"
>
> (Calvino, 1972: 18).

Innovative rules and methodologies must be able to combine an interpretation of the collective needs, which confronts the framework, complexity and changeability of the morphological and social organization of a specific territory. In addition, the answer to the needs must not lose the fundamental character of collective public service (Solarino, 2007). Therefore, it is necessary to set a methodology in order to define an innovative tool for the design and management of a public city that, starting from the current situation of existing services, defines the medium/long-term strategies.

After a careful analysis of the methods, techniques and tools and the definition of the characteristics and principles for a more detailed definition of territorial endowments compared to the traditional one, an innovative approach to the design and planning of services is proposed in this chapter. This new approach is also characterized by a dynamic process of assessment and adjustment of the designed solutions. It aims at defining a methodology for the planning of services, which has an innovative perspective if compared to the traditional one, based on quantity and zoning. Structured in three phases, the methodology is based on different territorial articulations, which consider both physical and social aspects and, through the integrated application of mathematical and technical tools, it is possible to achieve operative planning solution.

Chapter eight is structured according to Figure 8.1. Moreover, all the figures and tables present in the chapter are author' elaborations.

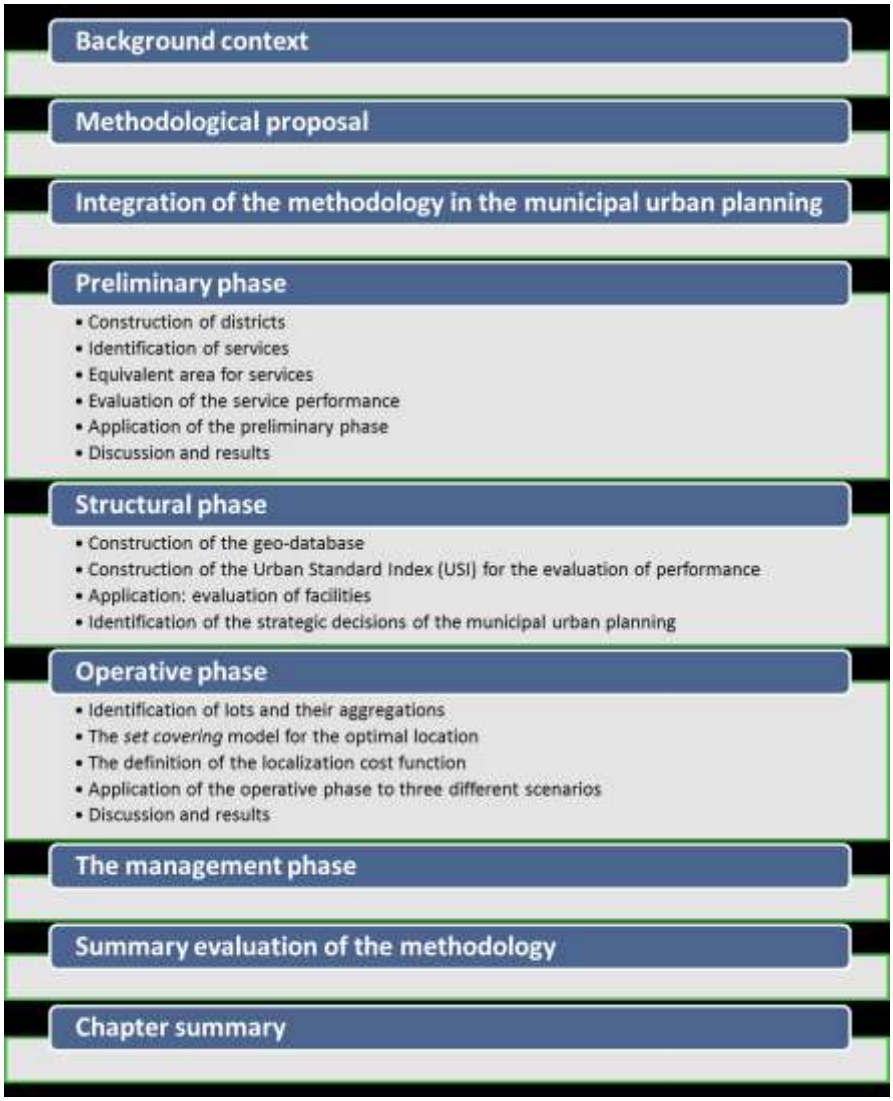


Figure 8.1 Chapter 8 diagram

8.1 BACKGROUND CONTEXT

The approach for the definition of the performance of the services has obviously a multidimensional character. In fact, its components can be:

- *territorial*, which is of significant importance in order to assess the presence of a minimum level of services and the specificity of each territory, which is the fundamental matrix for the collective identity. It is possible to identify territorial contexts, with reference to morphological features of utilization and organization of the territory, and urban contexts, which can be divided into urban sub-units. So, aimed the attention at the location of settlements for territorial contexts and at the identities, characteristics and local specialities for urban contexts, the provision of services can be ensured through a concrete answer to the actual needs of life that are found in them.
- *physical*, to take into account the state of consistency, use and maintaining the equipment, the legislative adequacy, the presence of ancillary spaces and additional equipment to the main function, the spatial interaction with other equipment and modes of use;
- *relational*, which alludes to social cohesion and a better morphological environment, gotten through a proper mix of functions;
- *temporal*, in relation to the fact that the functions and activities, located in the places, correspond to a mixture of times, also identifying the many uses of the single equipment. The time variable assumes important planning implications, given that, in a given catchment area, the same service can be enjoyed at different places and at different times;
- *environmental*, closely related to sustainability;
- *economic*, aiming at the definition of new forms of social partnership among public entities, profit and non-profits businesses and foundations of business in order to expand the opportunities for investment in structures of collective importance, not only for their implementation but, also, for the subsequent management;
- *legal*, which defines the rights and duties of all stakeholders.

In addition, for a real effectiveness of public action in the field of services it is necessary to consider some key factors:

- the needs must be considered as a whole and, in order to give them an appropriate response, a variety of services must be considered in their interdependence and possible relationships, even of the public/private partnership;
- the several stakeholders in the service delivery process must be involved in a joint action of the service construction. That action will

be the more effective the more respectful of the general interest, beyond the individual interests;
- the triggering of processes of listening, participation and promotion of voluntary initiatives.

These services become innovative standards, by assessing the quality through the well-being pursued by the community. In addition, because of the variety of the variables that, sometimes, are difficult to determine, the planning of services should be approached with different techniques, tools and methods, which, if integrated conveniently, must also be validated by participatory processes.

8.2 METHODOLOGICAL PROPOSAL

The methodological proposal has been divided into three phases: a preliminary, structural and operative phase (Fig. 8.2).
The preliminary phase is characterized by an assessment of the deficit or surplus of the urban standards in two territorial levels, both quantitatively and qualitatively. In this phase, it is also evaluated the possibility of planning new urban standards, in addition to the traditional ones, which are specific and that the local community, over time, recognizes them as such. Moreover, particular interest is given to the activation of a device of involvement of all stakeholders, making them the key players and active part. This leads to a rough overview of the scenario of vitality and quality of life of a region and the possible actions that can be put in place.
The structural phase is implemented in *GIS* environment. From a geo-database, several factor maps are created in order to be combined conveniently. Then a *Standard Urban Index* (*USI*) for each type of service and its Suitability Maps have been defined. This index assumes a double meaning: it can be an expression of urban densification or identifies the area within which it is possible to identify the areas where the urban standards can be allocated.
The next step is made by an operative phase that, starting from the lots present in an urban setting, through the integration of different tools, it is possible to arrive at the optimal solution of the location of services, i.e. the identification of the minimum number of equipment able to serve (cover) the whole territory.

The targeted use of different techniques and instruments in the different phases of the methodology, applied at different scales, from the municipal territory to that of the single lot, allows the conceptualization of planning of services, starting from the identification of strategic directions until their designing implementation. Given the complexity of social, economic and environmental dynamics brought into play, it is impossible to define in advance the scope for action and it is necessary to consider the design as a process of successive adjustments on available design alternatives.
The goal of this methodology is to give a support to the public entity in charge of urban planning and to investors and property developers, on the choices for locating urban standards and choices to be made in the free or retrained areas, in order to improve the urban quality and the collective well-being.

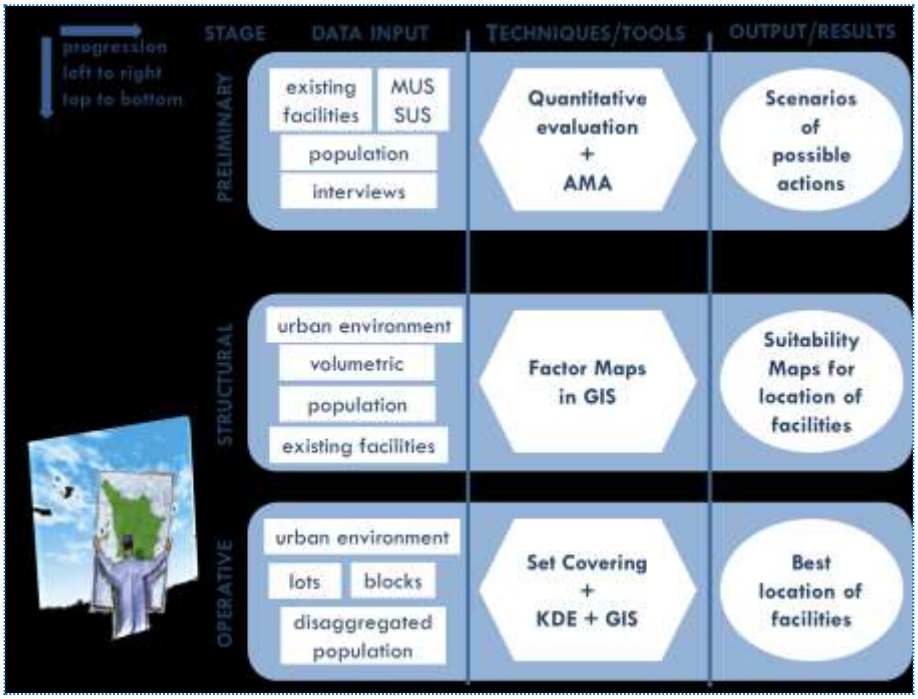


Figure 8.2 Methodological diagram

8.3 INTEGRATION OF THE METHODOLOGY IN THE MUNICIPAL URBAN PLANNING

Since the 90s, many Italian regions have created innovative rules for the government of the transformations of the city and the surrounding areas, adopting a new planning mechanism. The procedure of formation of an urban planning process takes place through a series of interrelated steps that guide the decision-maker, from the definition of objectives and strategies until the approval, implementation and updating of the plan as a whole.

The act of (municipal, provincial or regional) planning is divided into two parts:

- a part fixed in time, that is valid indefinitely, aimed at identifying the main lines of the long-term transformation of the territory, in view of the natural, environmental, historical and cultural values, of the need for soil protection, the risks arising from natural disasters, of the articulation of infrastructure networks and mobility systems;
- a part valid for a short period of time, aimed at defining the morphological and functional interventions of transformation of the territory in limited periods of time (for example, four or five years, which correspond to the period of an administrative mandate), related to the financial programming of annual and multi-annual budgets of the concerned authorities.

In fact, in the planning actions, a series of indications and requirements can be considered invariants under all changes of conceivable reality, while others have a valid link to forecasts, needs, political settings, programs that have a limited validity in time.

A municipal urban plan (*PUC*) has to ensure the organized, economic and careful use of the territory, creating value by the differentiation of localization (Lr Campania no.16/2004: art. 23). Moreover, in this process, it is essential to take into account the social needs of the community, since the overall objective of the plan is the welfare and economic development of the community, according to the environmental protection. This leads to understanding that the *PUC* is a dynamic system, which must be continually tested in its effects and in its consistency and must guarantee both a high degree of social inclusion and participation in the decisions (Izzo, 2016).

The sustainability of the municipal urban planning must also integrate with environmental, economic and, above all, social dynamics. The

attention to issues of social inclusion in the processes is increased with the introduction of the obligation to accompany the *PUC* with the Strategic Environmental Assessment (*VAS*) and the related forms of participation, introduced by the European policies and supported by other regional laws.
The formation of the Municipal Urban Plan in Campania Region, within the meaning of Regulation no.5/2011 of implementation of Lr no.16/2004, is essentially composed of two instruments, which are accompanied by evaluations related to the environmental aspects and participatory processes. Initially, there is the preparation of the Preliminary Plan (*PdP*) simultaneously to the Preliminary Report (*RP*) of the *VAS*. The *PdP* consists of several analysis maps bearing the elements of knowledge of the territory and of a strategic document that contains the lines of action dedicated to the strengthening of the urban and territorial fabric, through improvements to the morphological, functional and environmental structure of the city. The *PdP* and *RP* are taken notice of the adoption by the City Council, which submits them to competent persons in environmental matters as required by art. 13 of Legislative Decree no.152/2006. Considered the consultation, through a Council resolution, the City Council adopts the *PdP* and the *RP* and starts the preparation of the *PUC* and the papers of *VAS*[73]. In this phase, there is the production of all the papers and all the provisions of the law for a greater explanation of the made choices, according to the study of the collected data in the analysis phase, as well as to the needs and demands expressed by the representatives of the categories which were present in the consultation phase. The *PUC* is composed of the *Piano Strutturale* (structural plan) and the *Piano Operativo* (operative plan). The structural part, long-term, defines the rules of the physical transformations and compatible land uses. The programmatic plan shall establish, in the short

[73] The Legislative Decree no.152/2006 provides that, in the environmental report, drawn up by the proposer of the proceeding in an early stage of the elaboration of the plan or program, the significant effects, that the implementation of the plan or the proposed program could have on the environment, must be identified, described and assessed, as well as the reasonable alternatives that can be adopted in view of the identified objectives and interested territorial area. A preliminary report is produced and prepared in accordance with the Annex VI in Part Two of Legislative Decree no.152/2006, that meets the requirements of Directive 2001/42/CE. Then the *VAS* is made up of the *Environmental Report*, which must take into account the content and the level of detail of the plan or program, the state of knowledge and the information provided in the information systems of public administration, as well as the actual environmental assessment methods, and a *Not-technical Synthesis*, illustrating in a not-technical language the contents of the plan or program and the Environmental Report in order to facilitate public participation.

term, the uses (destinations) that are prescribed compulsorily and the physical transformations, i.e. the works and urban and executive building interventions, among the possible ones, that will be made mandatory. The operative choices, then, are reflected in the definition of the dimensioning and location of the possible destinations of use throughout the municipal territory and they adopt the rules governing the environmental and landscape aspects, defined as part of the structural component. These provisions affect the owner regime and are valid for the time period taken both for the urban constraints prearranged to the acquisition of the public areas and for the development rights of the private citizens. The City Council adopts the *PUC* and the *VAS*, thereby starting the stage of the observations and the subsequent activities of requiring opinions to the competent authorities, any counter-claims and any other matters necessary for the final approval of the *PUC* by the City Council. Once acquired the required opinions and the reasoned opinion for the *VAS*, taking into account any acceptable observations, including those of the provincial administration, which must be complied compulsory, and the opinions and acts included in the art. 3, paragraph 4 of Regulation no.5/2011, the *PUC* is transmitted to the City Council, which approves it. The approved *PUC* is published (including all the documents of *VAS*) simultaneously on the Unique Bulletin of the Campania Region (*Burc*) and on the City Council's website. The *PUC* is effective from the day following its publication in *Burc*.

As regards the aspects of sharing and participation in the training process of the Plan, it is necessary to specify that the Lr 16/2004 at art. 5, that is related specifically to the participation and advertising in the planning process, states that "at preordained stages for the adoption and approval of the planning instruments, the forms of publicity, consultation and participation of citizens including associations are ensured, in regard to the content of the planning choices". Moreover, in specifying the procedures for consultation of the organizations in the process of formation of the *PUC*, art. 24 only recalls any rules laid down in the statutes of individual municipalities and, in the absence of them, suggests that participation can take place through questionnaires, meetings and hearings, including by electronic means. So legislation considers the forms of participation, such as the intermediate participation, that corresponds to the implementation of the strategic choices in those structural, and the final participation, which follows the phase of adoption of the *PUC*. The law does not tell anything about an initial

participation, although in the current practice it is often possible to find it, since it takes on a reconnaissance character, dedicated to the involvement of political and social actors, organizations and associations, and is aimed at more comprehensive preparation of the *PdP*.
The methodology of this research, that has been developed for the planning of services and defined through three phases, aims at complementing the process regulated by the law, through the elaboration of strategies and structural and operative guidance. Each phase is declined differently and able to accompany the entire preparation of the plan, with precise decoding tools and techniques (Fig. 8.3). Besides, the participatory processes integrated by the law and practice also become essential for the planning and design of regional endowments, since they represent real instruments of validation of models and the consequent choices for the planning of services.

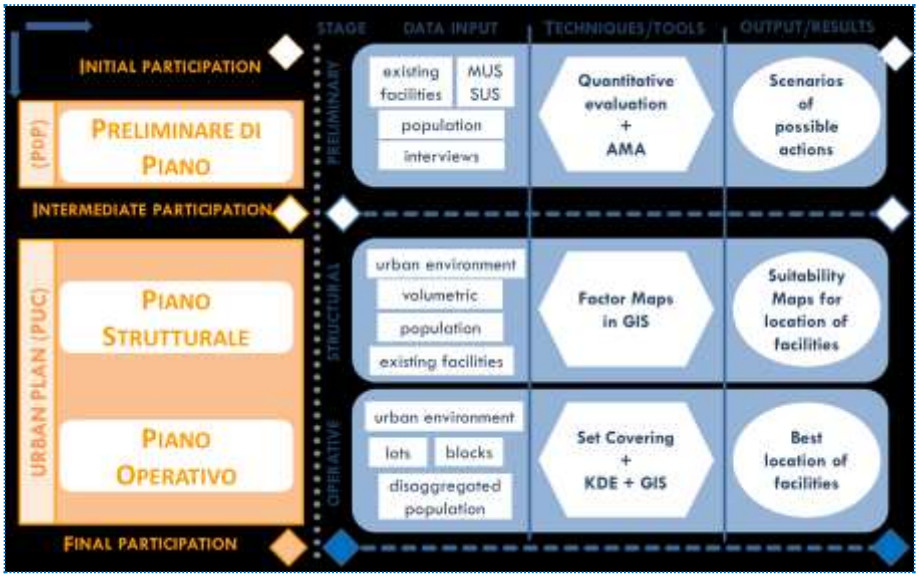


Figure 8.3 Integration between municipal planning and planning of services

Each phase of the methodology will be described in detail below and also applied to case studies through simulations of intervention in several municipalities, belonging to different territorial contexts of the Campania Region.

8.4 PRELIMINARY PHASE

The transition from a quantitative to a qualitative approach in the planning of services must consider detailed aspects of a specific urban context. The development of the supply of services, in fact, must take several factors into account, such as the variety of types, the actual usability, the design quality of the building structure and interior spaces of the lot, the inclusion in the urban neighbourhood and in the territorial context, the ability to integrate with other functions and other services and the balanced territorial distribution. In order to restitute the city to its citizens, it is necessary to provide to equipped areas, a network of facilities that supply services in urban areas and safe, protected, articulated and pleasant routes.

At an early stage of the development of the choices that assumes a more declaratory character of places and thrusts of the stakeholders, the first step is definitely an analysis of the current situation, which must be accompanied by an initial participation process aimed at a more comprehensive knowledge of the area and its needs. The next step is to transpose the requirements into a project, trying to understand what contributions and how many improvements it produces on the considered area, and, ultimately, effecting a rough estimate of the costs.

To define and evaluate operationally the actual presence of the existing services in the area, and therefore the quality of the same territory, a methodology has been identified, which can be divided into several steps:

- Territorial division into Minimal Units for Services (*MUS*) and Urban Sector for Services (*SUS*);
- Identification of sevices;
- Definition of an equivalent area of the service *i* (*Seq,i*);
- Evaluation of the performance of the service *i* (*PSi*);
- Preliminary assessment.

In Figure 8.4, there is the scheme of this phase.

Through a comparison between the potential demand for each equipment (due to users) and the existing quantitative and qualitative supply of public and private facilities and services, it is possible to define specific elements for the identification of policies of intervention in each territorial unit and draw a design scenario for the entire municipality.

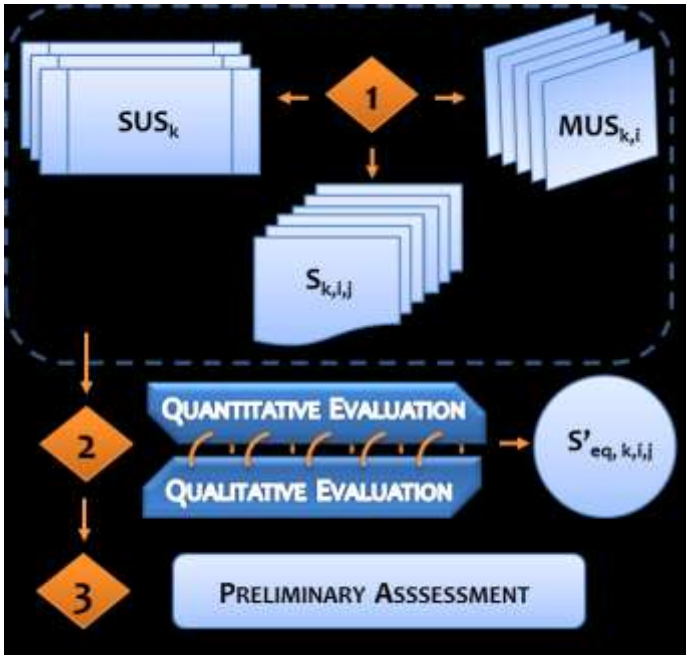


Figure 8.4 Diagram of the methodology in the preliminary phase

8.4.1 Construction of districts

The ambit of delivery of the service does not coincide with the entire municipal area and, consequently, its correct identification is extremely important, which can be carried out starting from the preliminary localization of a number of equipment and services placed in accessible areas in a certain temporal and spatial span. The perimeter of the ambit of delivery is essential in order to assess the presence of a minimum level of services and, subsequently, to identify the intervention priorities to be addressed, if necessary, also in the associated form with other municipalities (indeed, for questions of jurisdiction in the organization and management of a service, often its implementation does not depend directly by the Municipality, which must therefore refer to other subjects).

Therefore, it is necessary to define the articulation of the territorial system, namely the definition of territorial units of study and project, within which it is possible to evaluate the quantitative presence and a minimum level of performance of services (Fig. 8.5). In view of the

specific nature of the places, the municipal area can be divided in relation to municipal fractions, neighbourhoods, census sections defined by Istat, territorial physical barriers (such as, the presence of rivers), road infrastructure, catchment areas (for example, for school supplies), or basins for the management of some types of services.

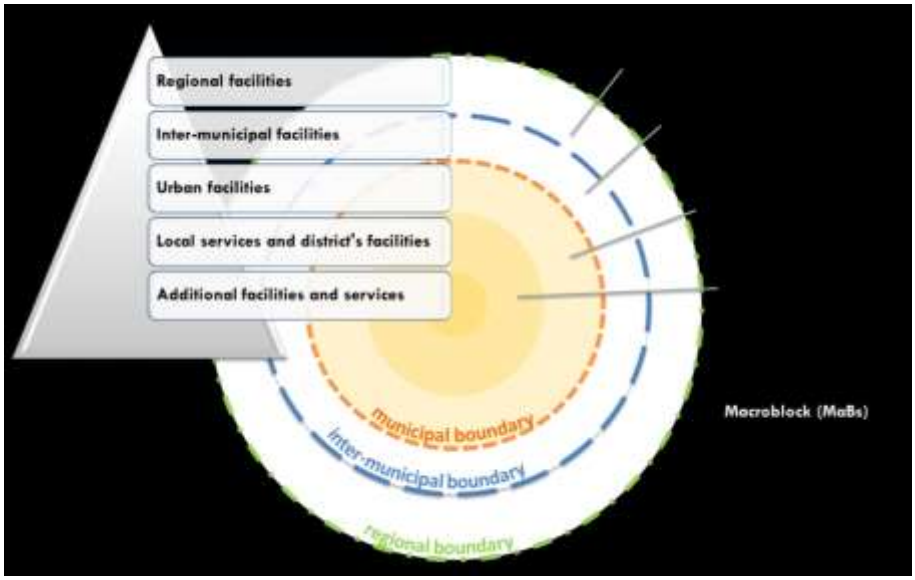


Figure 8.5 Services and territorial levels

In the preliminary phase, it is possible to identify two urban levels specifically for the study of services:

- the *urban sector for services* (*SUS*),
- the *minimal units for services* (*MUS*).

The urban sectors for services are unions of minimum units for services, that have been specially grouped together in relation to specific characteristics of the examined territory and that take into account, above all, the sense of belonging to local communities, thus highlighting the social aspects.

The minimal units for services, instead, are defined in relation to:

- the historical centres and the parts of the territory characterized by a strong identity;
- territorial sections defined for the population census;

- the presence of physical barriers and similar elements within the urban tissue;
- assessments relating to the physical accessibility of services.

For each *MUS*, it is possible to know the data related to the population and its varying dynamics.
Starting from an analysis of the existing services in each *MUS* and their supply, the services are quantified and qualified through the following methodology.

8.4.2 Identification of services

As for the cognitive framework of existing services, it is necessary to make some considerations. Firstly, for a correct and complete reconnaissance of the supply, the offered service should be considered as the sum of two components: the facility, i.e. the physical structure that houses an activity, and the activity that an entity, an association or a private citizen offers to the user. This distinction allows taking into account not only the existing equipment but all activities of service that are actually available in the municipality, including those which do not identify with an area or a building structure. Inside the same equipment, also, more than one activity can be accommodated. This distinction is also useful for the preparation of a computerized catalogue of services, in a relational database, containing the data relating to equipment and activities, connected to a cartographic base through the use of application of a *GIS* software.
Since the ultimate goal is to ensure the coverage of needs for services by the population, it is necessary to register the existence and quality of a service, regardless of the affiliation of the service to the public sector or to the private one. The inventory of these facilities does not aim at differentiating the services provided by the public sector and those provided by the private sector or, for example, in the public sector, at distinguishing what pertains to the competence of the State, the Region, the Province, the Municipality or Inter-municipal bodies. Today, in fact, the distinction between public and private service facilities is outdated, since there are many providers of services belonging to the private sector, and many associations which take the management of a part of public services through agreements established with the public entities.

The analysis of the offered services considers a new articulation of the same in different subject areas, identified through the traditional method of organizing public services and integrated with a number of new categories for the urban classification, that is useful to reconstruct the cognitive framework of equipment of service, which is present within the territory, as defined in paragraph 6.5.
The information of the service is collected in forms of survey for each thematic area. They are organized in several parts, concerning the equipment registry, in which are shown the name, the location, the type of provided services and their quantitative dimensions, in terms of gross floor area, besides the classic land area, and in terms of users actually served for the activities. Moreover, there is information on the real estate data, photographic images and cartographic representations, and further information concerning the types of facilities used and the mode of service delivery, i.e. public or private delivery. Such form is also supplemented by performance assessments that will be determined in the following step of the preliminary phase of this methodology.
So the information that is available now can be schematized according to Figure 8.6.

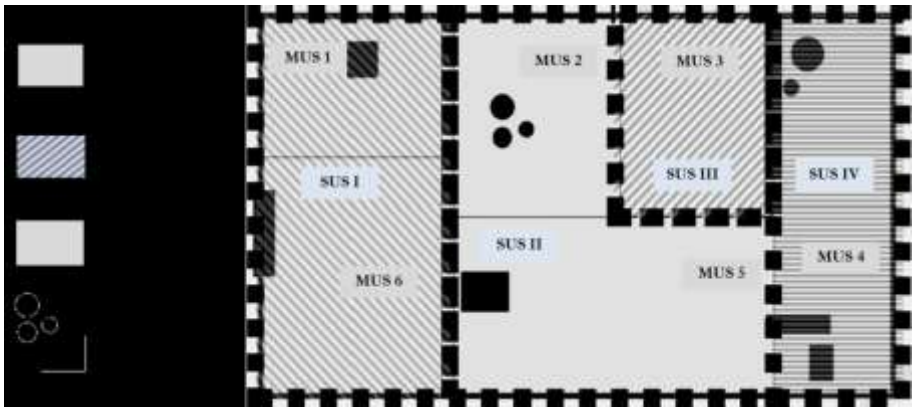


Figure 8.6 Districts and identification of facilities and services

8.4.3 Equivalent area for services

A new quantitative assessment of urban standards is the one that presupposes the abandonment of the land area (*Sf*), preferring the

effective area of the service. Consequently, it can be defined an equivalent area (*Seq*) for the *j* service[74].
Generally, for each service, it is possible to define its equivalent area through the combination of the following items:

- S_{LS}= *usable area of the floor of the service*, which, depending on the type of service, will coincide with a gross surface, a land area, a territorial area, a linear equivalent area for services that have a linear tendency;
- S_{Acc}= *ancillary area*, intended for service spaces that contribute to improving the quality of the provided service;
- S_{Att}= *equipped area*, characterized by appropriate physical and structural characteristics supporting the provision of service;
- S_P= *enclosed area*, that is characterized by its own physical individuality and its structural compliance and does not form an integral or constituent part of the effective area of the service. It is preordained to an objective need for the disbursement of the principal service, that cannot be measured functionally and objectively as a gross area of another service or cannot have its own independent destination because it has to support the main service;
- S_{Con}= *related area*, that is strictly connected to the main service that is being evaluated, necessary for the provision of the same.

Within the *MUS*, the services are identified and classified into: prevailing service or main service, ancillary service, equipped area, enclosed area, and related service.
Explaining more carefully the expression for calculating the equivalent areas, the following functions can be defined (considering the n= number of services in a lot, and the m= number of services which share the same S_{con}):

- the equivalent area of the main service:

$$S_{eq,j} = S_{LS} + \frac{1}{n} S_{Acc} + \frac{1}{n} S_{Att} + \frac{1}{n} S_P + \frac{1}{m+1} S_{Con} \ [m^2] \quad [8.1]$$

- the equivalent area of ancillary and equipped services:

[74] Actually, the service *j* is defined with respect to the index representative of the *MUS* (*i*) and *SUS* (*K*). For reasons of simplicity, from now on, the only subscript *j* will be indicated and it will be omitted in making explicit the formulas.

$$S_{eq,Acc} = \frac{n-1}{n} S_{Acc} + \frac{1}{n} S_P + \frac{1}{m+1} S_{Con} \quad [m^2] \quad [8.2]$$

$$S_{eq,Att} = \frac{n-1}{n} S_{Att} + \frac{1}{n} S_P + \frac{1}{m+1} S_{Con} \quad [m^2] \quad [8.3]$$

- the equivalent area of related services:

$$S_{eq,Con} = \frac{1}{m+1} S_{Con} \quad [m^2] \quad [8.4]$$

From the example shown in Figure 8.7, it is possible to have a different assessment of the services in a *MUS*, that, if applied to a real case, seems to join better with the needs actually received by citizens.

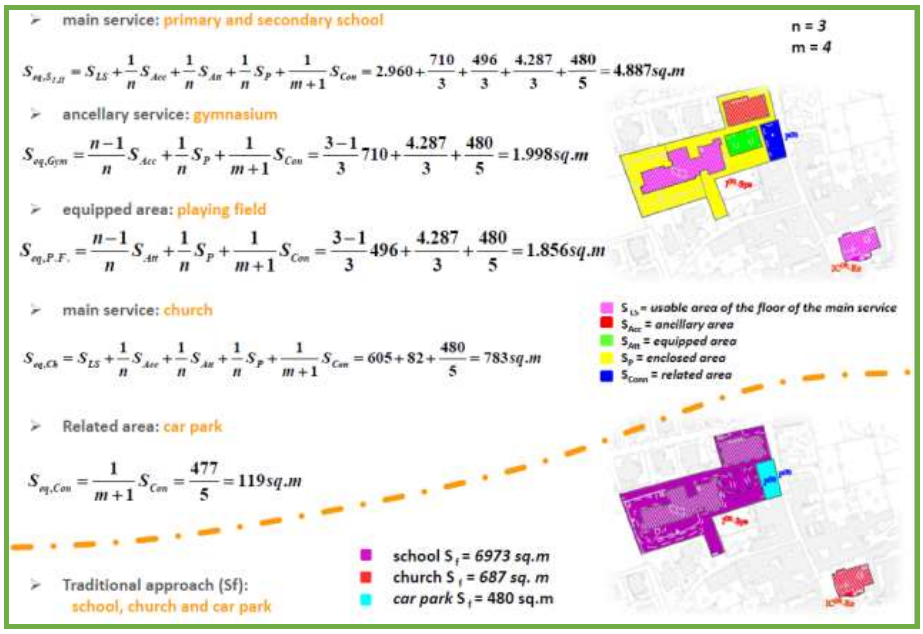


Figure 8.7 Example of calculation of the S_{eq} of services

8.4.4 Evaluation of the service performance

The need to refer to more careful parameters, able to interpret complex and diverse needs, finds space in the current debate regarding the topic of the common indicators to be taken for the reading and evaluation of services. The use of quality indicators presupposes the effort to build common criteria in relation to which it is necessary to assess the services. When referring to the welfare and quality of life, these criteria need to consider a number of variables that are difficult to organize and summarize. For this reason, it is necessary to find a way to organize and systematize a series of complex information.

Despite advances in the identification of qualitative indicators for the various aspects of daily life, the great difficulty is in translating these parameters into objective variables, making possible the quantification of the characteristics of the services, in order to calculate their good functionality and make comparisons with other similar structures. This procedure is essential for assessing the levels of sustainability of urban standards. The choice of an indicator is still a choice of orientation and even more with the introduction of qualitative parameters, that are not detectable in strictly numerical terms since they are never uniquely determined and interpreted.

The new indicators are not absolutely of unambiguous and simple definition and claim a multidimensional approach to the territory, where the preliminary analysis to the transformation takes place in greater interaction as possible with local actors. The experimentation of indicators of quality and urban needs at the local level should be linked to the creation of real statutes of places, built through the intersection of analysis and different pieces of knowledge, and related to different methods and tools of knowledge of the area. After quantifying all the parameters, analytical expressions can be established in order to calculate the value of each individual service, and confirm which category is the most deficient category.

The developed methodology examines 26 variables (Tab. 8.1) related to the system of urban standards, dividing them into four categories of parameters. Furthermore, the multi-attribute analysis, that must be implemented, requires the hierarchical arrangement of a scale of values, based on the weight that each parameter can assume in the situation in question.

Table 8.1 Parameters, indicators and qualitative variables

Parameters	*Indicators*	*Variables*	*Features*
Territorial Unit of Reference (A_U)	**Urban Sector**	**Basic services**	it indicates the presence of the services that have a number of users not less than 5,000 inhabitants.
		Variety	inside the unit, which can thus be characterized by balanced imbalances, or the presence of an overriding service and others of minor importance, self-sufficiency, with the presence of different services of the same weight, and specialization, i.e. the presence of an only type of service.
		Spatial balance	it indicates the disposition of services of the territorial unit, which can be dispersed, polarized or spread in the group.
Urban Unit (C_U)	**Location**	**Position**	specifying the position in the territorial unit, depending on if it is central, semi-central, marginal.
		Compatibility with the boundary	a consistent judgement about the service location and its immediate boundary.
		Integration with the landscape	it specifies if there are services which are not part of the structure but closely related to it.
		Public urban security	relating to the presence of the public lighting network.
		Environment	relative to the presence of any air or noise pollution.
	Catchment	**Extension**	it indicates the origin of users who can be: supra-local, urban, and local.
		Side-walks	presence or absence of external side-walks to the structure.

Physical Structure (S_F)	**Accessibility**	**Architectural barriers**	presence or absence of external architectural barriers to the structure.
		Bicycle paths	it evaluates the distance of the service from the cycling network.
		Public transports	it evaluates the distance of the service from public transport stops and/or bus service for schools.
		Public car parks	it evaluates the distance of the service from the public car parks.
	Usability	**Car parks**	it indicates the presence or not of car appurtenant seats.
		Related services	relating to the structures included in the service, which are the completion or part of it. (e.g.: sports/gym equipment, refectory/canteen, presence of residential accommodation, classrooms for supplementary activities/workshops, open appurtenant spaces, game equipment).
		Conservation status	it represents the degree of wear of the structure.
		Internal barriers	it indicates the presence of impediments within the structures that do not allow the movement of the disabled.
	Functional Characteristics	**Use over time**	it indicates the prevalent use of the service (daily, working-day, non-working day and seasonal use).
		Multi-functionality	it indicates the diversification of the use of different services.
		Flexibility	adaptability of the equipment to provide a different service depending on the occurrence.

	Tooling	**Connection to technological networks**	obviously, some services cannot be provided without the connection to technological networks.
		Safety	closely related to the physical structure of the service, it is understood as the realization of secure services to all types of risk on a territory.
Management of Service (Gs)	**Management**	**Regime**	It indicates the type of management (i.e. public/private) of the service.
		Property	the type of (public/private) ownership of the service
		Delivery in the time	it indicates the mode of service delivery over time (stable, long, short-term).

For each *i* service, the performance can be evaluated through the following funtion:

$$PS_j = \alpha A_U + \chi C_U + \sigma S_F + \gamma G_S \qquad [8.5]$$

where:
- PS_j = Performance of the Service *j*,
- A_U= parameter related to the Urban Articulation,
- C_U = parameter related to the Urban Context,
- S_F = parameter related to the Physical Structure,
- G_S = parameter related to the Management of the Service.
- $\alpha, \chi, \sigma, \gamma$ = wheights of the different parameters.

These parameters depend on various indicators, that are combinations of variables, to which are assigned numerical values. During the initial participation, a questionnaire can be given to the participants and users of services to evaluate the proposed indicators expressing the level of satisfaction of the different variables on which they depend on a ten-point scale, indicating an increasing satisfaction. These indicators can be evaluated, through a simple linear combination and then must be

appropriately normalized, obtaining the values reported in Table 8.2. Another consideration of the indicators is that they depend on the type of service or equipment that is evaluated, in the sense that not all indicators can be covered simultaneously, and then the maximum value of the corresponding parameter will be different.

Table 8.2 Evaluation of the parameters

	Min	Max	Norm. Min	Norm. Max
$\mathbf{A_U}$	0	30	0	0,12
$\mathbf{C_U}$	0	110	0	0,42
$\mathbf{S_F}$	0	90	0	0,35
$\mathbf{G_S}$	0	30	0	0,12
Tot	0	260	0	1,00

The assessment of the importance, from which to infer the weight that each indicator has on the overall judgment of the quality, is instead asked the interviewees on a different scale, precisely because they would not confuse the importance with the satisfaction. The weights are evaluated through a matrix of pairwise comparison. From this comparison, the degree of importance of one element with respect to another, both belonging to the same level, can be established. The comparison result is then a coefficient α_{ij}, said dominance coefficient, which represents an estimate of the dominance of the first element (*i*) compared to the second (*j*). An example is given in Table 8.3.

Table 8.3 Weights assessment

	A_U	C_U	S_F	G_S			N° el.	Pesi	Norm. Pesi	
A_U	1	0,5	4	5			4	1,78	**0,39**	α
C_U	2	1	2	2				1,68	**0,36**	χ
S_F	0,25	0,5	1	1				0,59	**0,13**	σ
G_S	0,2	0,5	1	1				0,56	**0,12**	γ
								4,62		

The value of the *performance of the service*, appropriately normalized, can lead to defining the performance classes (very low, low, medium,

sufficient and high classes), considering the normalized performance index:

Very low: $0 \leq PS_j \leq 0{,}20$;
Low: $0{,}21 \leq PS_j \leq 0{,}40$;
Medium: $0{,}41 \leq PS_j \leq 0{,}60$;
Sufficient: $0{,}61 \leq PS_j \leq 0{,}80$;
High: $0{,}81 \leq PS_j \leq 1{,}00$.

At this point, the combination of the quantitative approach and the one of performance leads to define a qualitative equivalent area, that only in the case of services with maximum performance may coincide with its equivalent area:

$$S'_{eq,j} = PS_j \cdot S_{eq,j} \quad [m^2] \quad [8.6]$$

The meaning of such area is the one that, even if the physical facilities provide services, which probably with a conventional assessment would respect the binding limits of the law, through an equivalent assessment probably something could no longer work, especially if the services are affected by an inadequate delivery.

8.4.5 Application of the preliminary phase

The methodology, developed by applying the values of first experimentation to the parameters, was tested in the municipality of Castel San Giorgio (Sa)[75], on the current situation. The territorial context (Figs 8.8a,b), to which it belongs, is mixed between an inside context, as it is not close to the coast, and a metropolitan context, as it fits into a reality, the Agro Nocerino-Sarnese, whose territorial characteristics (with a large amount of settlements, belonging to different administrative

[75] The municipality of Castel San Giorgio is located in the middle of the Sarno's valley and lies halfway between the plain of the Agro Nocerino-Sarnese to the west and the high Irno's valley to the east. It covers an area of 13 sq.km and has about 13,411 inhabitants (Istat 2011), for a density of 1,056 inhabitants/sq.km. It is characterized by a poly-centric settlement structure divided into 11 centres, in addition to the administrative centre.

domains, connected continuously with each other), population density and economic, social, infrastructural features can be integrated in the large area at all municipalities falling in the valley.
In 2012, the City started, in accordance with Lr no.16/2004, the preparation of the Municipal Urban Planning and its related papers, which was entrusted to the Municipal Technical Office and with the technical and scientific support of the University of Salerno.

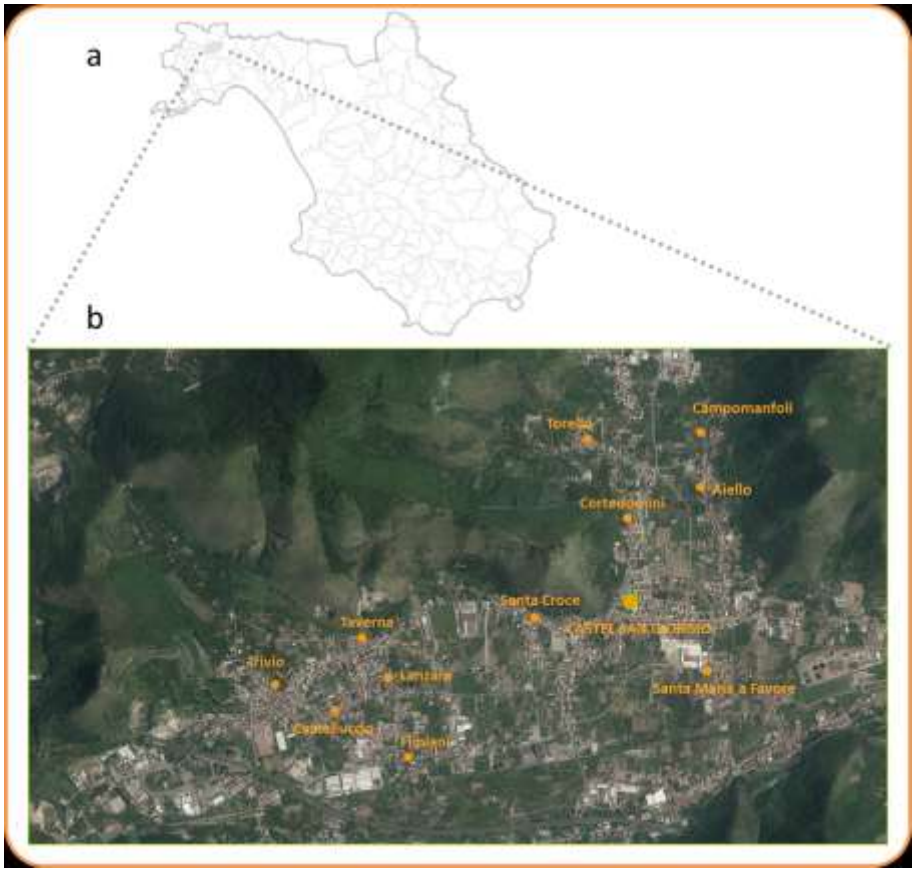


Figure 8.8 Territorial framework: a. position in the province of Salerno; b. inhabited centres and city districts

As part of the municipal planning process of Castel San Giorgio, it was put in place a participatory process, which developed in a long series of meetings, which showed a particular attention to the containment of land use and the need, in the phase of austerity and the overall current lack of

public resources, of a new and sober approach to the organization issues of the city and the territory, especially starting from the recovery and recycling of the existing urban tissue and of the entire abandoned and/or underutilized assets of the municipal area. No further expansion, but facilities and equipment became the core part of a poly-centric and articulated system of settlement. There was also the recourse to innovative forms of use of services, through the recovery of abandoned structures and infrastructure in degradation. Ultimately, the main theme of the new *PUC* regarded the need to integrate and implement the public spaces with the entire living tissue.

In the analysis phase to prepare the PUC, it was revealed a high deficit of urban equipment, both quantitatively and qualitatively. This deficit was also confirmed in the participatory process, in which the stakeholders, political and administrative forces, representatives of associations and ordinary citizens had denounced the lack of services, advancing proposals, evaluated and then assumed in the plan.

Simultaneously to the identification of equipment and services in the municipal area, the study, carried out for the definition of quality of services, led to partition the municipality in 8 *MUS*, which were then organized into 3 *SUS* (Fig. 8.9a,b).

The assessment of the *Seq* was evaluated for different services in the municipal area, as well as their performance, which led to identify the more deficient services in quality, for which there was the necessity to make the appropriate social, economic and financial considerations, relating to the recovery or even to the service dissolution (Fig. 8.10).

Then the qualitative *Seq* was calculated and from this, it was possible to make a comparison with respect to the land area. Table 8.4, referring to the entire municipality, highlighted a further increase of deficit of areas and equipment, which from the initial analysis they were already deficient in terms of land area. The deficit increased still more due to the evaluation of the services in terms of qualitative equivalent area. In addition, through the new calculation method, it was possible to bring out the lack of services that more were perceived by the population, namely the head relating to parking, to equipped green areas and even minimally for educational facilities.

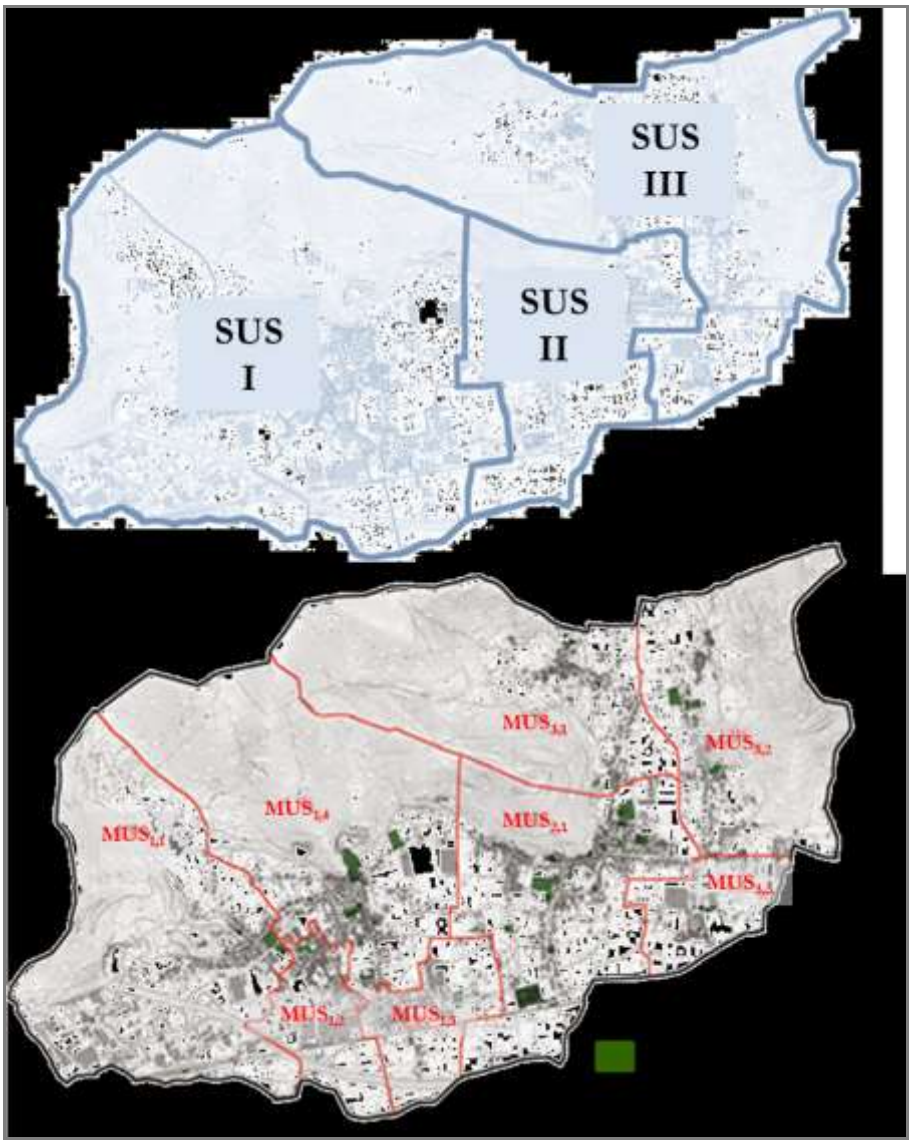


Figure 8.9 Districts of the case study: a. identification of the SUS; b. identification of the MUS and equipment and services.

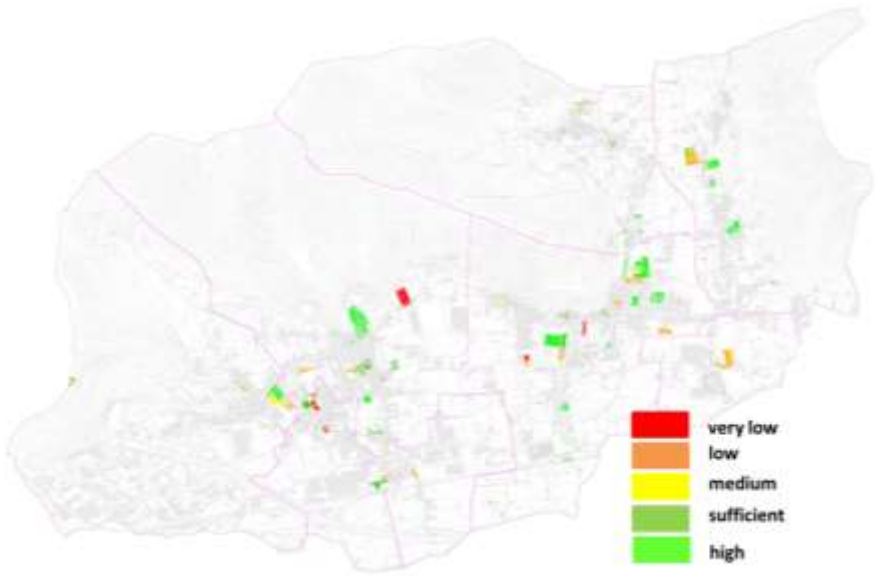


Figure 8.10 Castel San Giorgio (Sa): performance of services

Table 8.4 Comparing areas for services in the municipality of Castel San Giorgio

Type	Total area				
	Sf [DI 1444/68, Lr 14/1982] [sq.m]	Sf [sq.m]	Seq [sq.m]	S'eq [sq.m]	Sf-S'eq [%]
education	66,785	27,815	29,191	18,653	-33
public interest	29,682	30,098	40,038	29,843	-1
religious facilities	14,841	26,203	25,842	19,064	-27
green spaces	133,569	45,619	49,763	36,526	-20
car parks	37,103	33,372	22,185	15,666	-53

8.4.6 Discussion and results

The methodology, applied to the town of Castel San Giorgio, led to focus the attention on the need to take action, not only from the quantitative point of view, given the deficit of endowments that characterizes the current scenario, but also from a qualitative point of view, with reference also to the growing prevision of the municipal population.

The widespread lack of equipment and space for the community has been key feature of the interventions during the initial participation, animated by proposals for popular sports centres in the area, forecasts of playgrounds in open areas or not used daily, implementation of appropriate and common areas equipped for children and the elderly, the promotion of a green soul for the city, forecasting a real greenway, related to parking in nodal and strategic areas, so as to facilitate the pedestrian accessibility of the central areas of the territory. The proposal to sustainable mobility was substantiated with a project along the Solofrana river, i.e. the provision of bicycle paths, footpaths and bridle paths along the banks of the stream, which flows around the municipal boundary to the south, by incorporating this sustainable mobility corridor with trails and tracks. Particular interest was aroused, finally, the rediscovery of urban gardens, not only as a cultural testimony of the past but, also, in the function of production, to be reserved for people who are economically weak.
All the received requests, integrated by the studied methodology, led to the design of a possible scenario for municipal services (Fig. 8.11), which by the way it was then also valid in the phase of intermediate participation for the adoption of the Preliminary Plan.

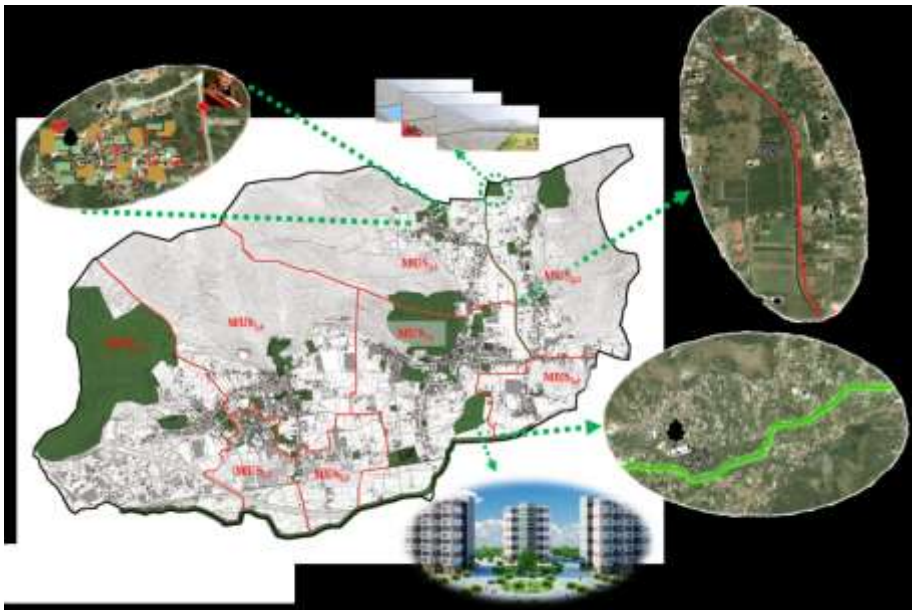


Figure 8.11 A possible scenario for Castel San Giorgio

8.5 STRUCTURAL PHASE

The second stage of the methodology focuses on the fact that the performance of urban facilities is defined in terms of a number of people who can really benefit from some facilities. This amount depends on the scope of the facility, which is defined as the maximum distance over which the user is no longer willing to bear the cost, in terms of time, necessary for arriving at the point of the service delivery. (Christaller, 1933). As a consequence, the scope consists in the identification of the area of influence of the facility.
The areas of influence have a different size depending on the facilities, and, moreover, their threshold values have been defined by literature and technical manuals as a function of population density (Colombo et al., 1996; Cnr,1986; Mercandino, 2006). The function of the radius of influence for some facilities is represented in Figure 8.12.

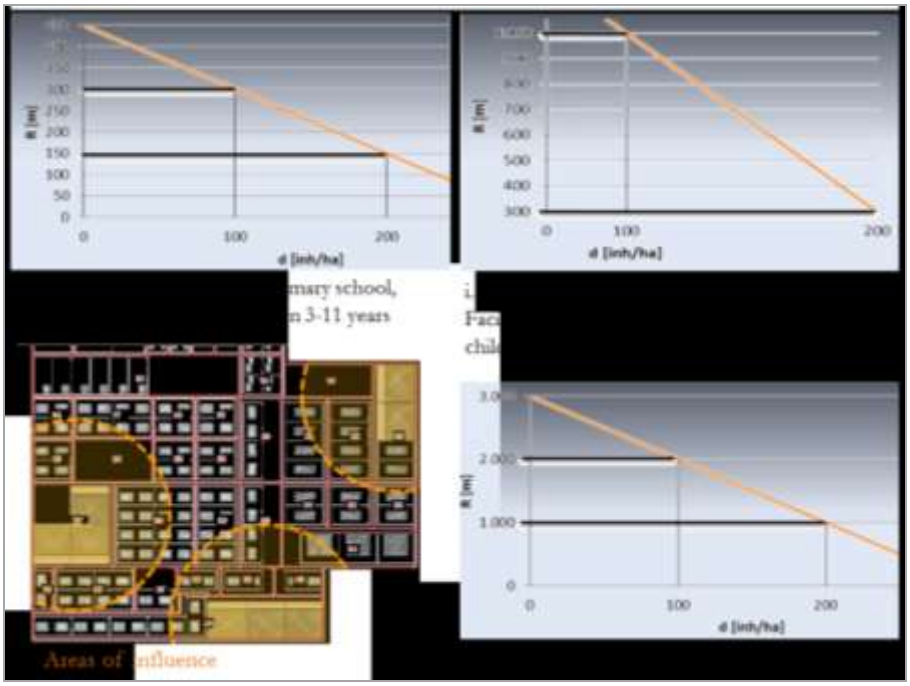


Figure 8.12 Urban Facilities Closeness: areas and radius of influence

The methodological diagram for the evaluation of the performance of community facilities and services, that has been implemented in a GIS environment, consists of three main phases (Fig. 8.13):

- construction of a database;
- definition of an index to provide services;
- evaluation of the strategic choices of the urban plan.

In this stage of the methodology, indeed, it has been developed a spatial index, that is a function of a set of indicators that refer to the population and the area of influence of the generic urban facility, and which could be considered one of the bases for the strategic choices of the urban plan.

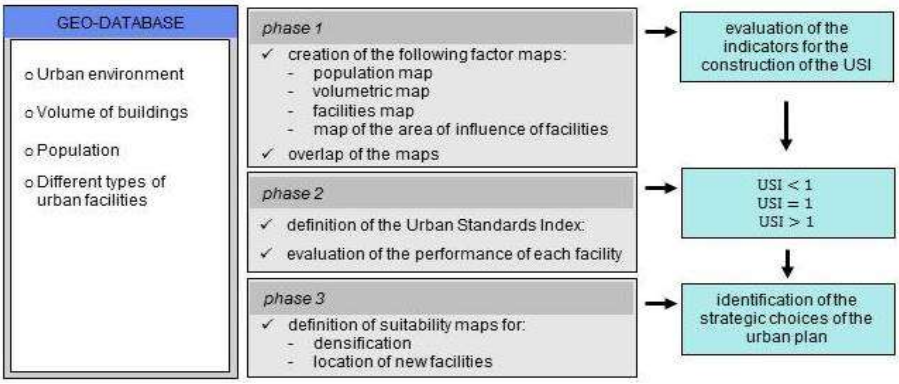


Figure 8.13 Flowchart of the structural stage of the community facilities planning

8.5.1 Construction of the geo-database

For the current purposes, the focus has turned towards the GIS applications from ESRI product family, especially ArcGIS. For the creation of thematic maps, the applications of ArcGIS 10.3 System has been useful.

The geo-database is built starting from the mapping and volumetric information of the buildings on a given municipality. The shape-files related to population disaggregated by age of the most recent census[76] and services are then added. In particular, the population is aggregated to the shapefile of the volume, in order to determine the most likely

[76] In the following case study, the Istat Census 2011 has been used.

geographic distribution. After defining a map with all the facilities and services, there is the identification of the radius of influence (buffer)[77] for each of them and the assessment of the maximum distance that each user should go on foot or with different modes of transport to get to the service. Then the identification of the portion of the population of the municipality that can access the equipment and public services is defined through the Identity Analysis[78]: the census sections integrated by the volumetric (shapefile inputs) are superimposed on the buffer identified in the previous point and in this way it is got a new shapefile (similar to the input one) with all census sections or parts thereof which are, however, classified with '*-1*' if they do not fall into the buffer, or '*0*' if they fall.
So the percentage of the population that is served at the urban scale can be calculated for each type of service.

8.5.2 Construction of the Urban Standard Index (USI) for the evaluation of performance

From the previous considerations and by overlapping the factor maps in the previous phase, the Urban Standard Index (USI) for each type of facility (*i*) can be defined as:

$$USI_j = \frac{A_j}{P_j} \times \frac{1}{d_{N,j}} \qquad i=1,2,\ldots n \qquad [8.7]$$

with:
- P_j= population which use the service, which is estimated by the combination of the population map and the map of the area of influence of facilities;
- A_j= the land area of the *i*-th facility;

[77] Buffer Analysis is an ArcTool function that creates around services (timely) polygon buffer (in this case it was decided to create circular buffer) at a specific distance from the same service (radius of influence).
[78] The Identity Analysis is function of ArcTool that calculates the geometric intersection between a feature input shapefile and an identity feature shapefile. The shapefile of input or the part of it that overlaps the Identity feature shapefile will take on the characteristics of the identity feature shapefile.

- d_{Nj}= coefficient of homogenization, which coincides with the endowment of urban standard, as defined in the DI 1444/68.

The combination of the areas of influence of the facilities with an *USI* higher than the unit value identifies a suitability map for localization of possible actions of densification, according to a scale of values ranging from high to low and zero, depending on the greater or lesser *mixité* of services that must be guaranteed to the population. Similarly, for the combination of the areas of influence for the facilities with an *USI* less than unity, a suitability map for the location of the new facilities can be obtained. Obviously, the priority of location should be chosen in the first place in the intersection of the areas of influence of the different facilities to ensure *mixité* of services to the population.

8.5.3 Application: evaluation of facilities

A major part of the Italian territory is characterized by a spatial organization based on "small towns", of which the specific nature is included in the concept of "Internal Areas". The criterion of "distance" (remoteness) of the territories and residential settlements from cities offering essential services constitutes the crucial definitive element that is adopted in the conceptual construction of the perimeter of the internal areas[79] (Aa. Vv., 2014). In the inland areas, the organization of facilities and services, and their spatial distribution are challenges that can be overcome through the research of new tools.

Generally, it has been already highlighted that the notion of urban standards seems no longer to be necessarily linked to the physical endowment of areas or buildings, but it can be extended to all those activities which contribute concretely to achieve a higher quality of life. In order to meet the real needs of local communities, elastic and flexible services and facilities must be combined also with the change in the method for their evaluation. This involves the transition between the concept of urban standards based on quantity and the one based on performance.

One of the main difficulties of the inland areas is due to the fact that the provision of public services is characterized by a high cost-benefit ratio. It seems clear that the sharing of most municipalities of the concrete implementation of services and facilities enables the identification of

[79] National Strategy for the Internal Areas.

areas of consultation and the policy planning for services to supra-municipal nature and, in general, the definition of common parameters and criteria of quality and localization. However, there is a category of services that cannot be considered at the inter-municipal level. This category includes services of urban planning, i.e. services that are explicitly defined in the urban planning, which characterize the liveability of the town and are strictly connected to the urban quality and the general well-being of society. Moreover, those services are centralities in the process of redevelopment of the city, of the reorganization of the qualitative/quantitative supply and the territorial endowment. (Moraci, 2007).
The proposed methodology has been tested on the municipality of San Gregorio Magno in Campania, in the province of Salerno. San Gregorio Magno is situated in the inland area of the Ancient Volceij (South Italy): a context in which actions of territorial government and of cohesion policies are required to increase the qualitative supply of the overall system (Fig. 8.14).

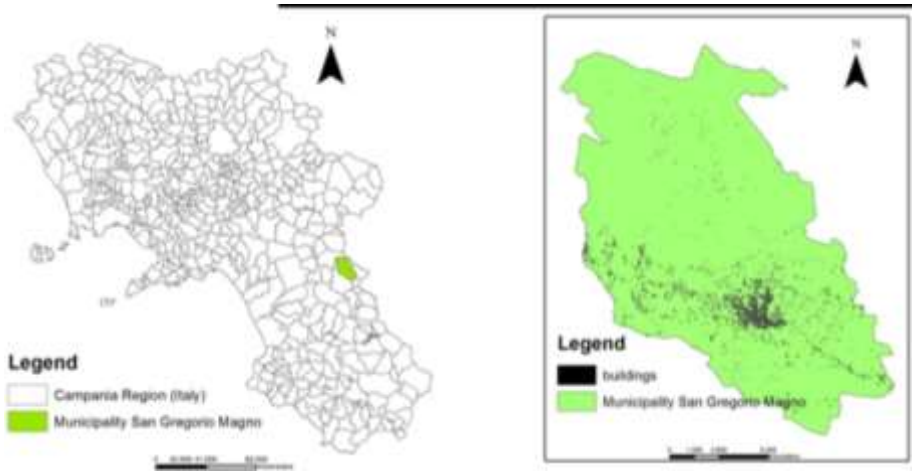


Figure 8.14 Territorial framework

The initial assessment of a deficit per capita of urban standards (DI no.1444/1968 - Lr no.14/1982), as shown in Table 8.5., sets out a strategy for designing a net of facilities throughout the municipal territory.

Despite this research seeks to emphasize the use of new forms of urban standards, for the case study, instead, only the classic categories are been analysed: green spaces, car parks, schools, and facilities of public interest (as well as the religious facilities, that are evaluated separately in Campania).

Table 8.5 Quantitative and traditional analysis

type of facilities[80]	minimum endowment per capita [DM 1444/68-Lr 14/1982]	total urban standards - 2015				
		Area	current endowment per capita[81]	needed area	deficit	
					area	endowment per capita
	[sq.m/inh.]	[sq.m]	[sq.m/inh.]	[sq.m]	[sq.m]	[sq.m/inh.]
green parks	**9**	23,544	**5.4**	39,339	15,795	3.61
education	**4.5**	9,687	**2.2**	19,670	9,983	2.28
car parks	**2.5**	12,705	**2.9**	10,928	-1,777	-0.41
common interest	**2**	20,068	**4.6**	8,742	-11,326	-2.59
worship	**1**	3,614	**0.8**	4,371	757	0.17
total	**19**	**69,617**	**15.9**	83,049	13,432	3.07

It is important to highlight that the deficit amount of facilities concerns public parks and schools, while the car parks and facilities of common interest would seem to respect the normative endowment. The results, obtained by applying the described methodology to all the facilities, both those in surplus (Fig. 8.15a,b.) and in deficit (Fig. 8.15c,d,e,f), are proof that due to their incorrect spatial distribution, there is a deficit of those facilities which respect quantitatively the law, too. In fact, taking as an example the car parks, it can be seen that approximately on ten car parks identified, only six appear to have a greater *USI* index unit, while the other four are undersized, and so they seem to be insufficient to provide the service for which they were designed. As a first instance, this results in having to identify further areas, in correspondence of those undersized, in order to ensure best living conditions of the places for the part of the population that is not actually served.

[80] According the types of urban standards defined by the Lr no.14/1982.
[81] No. of inhabitants considered is 4,371, on 31st December 2014.

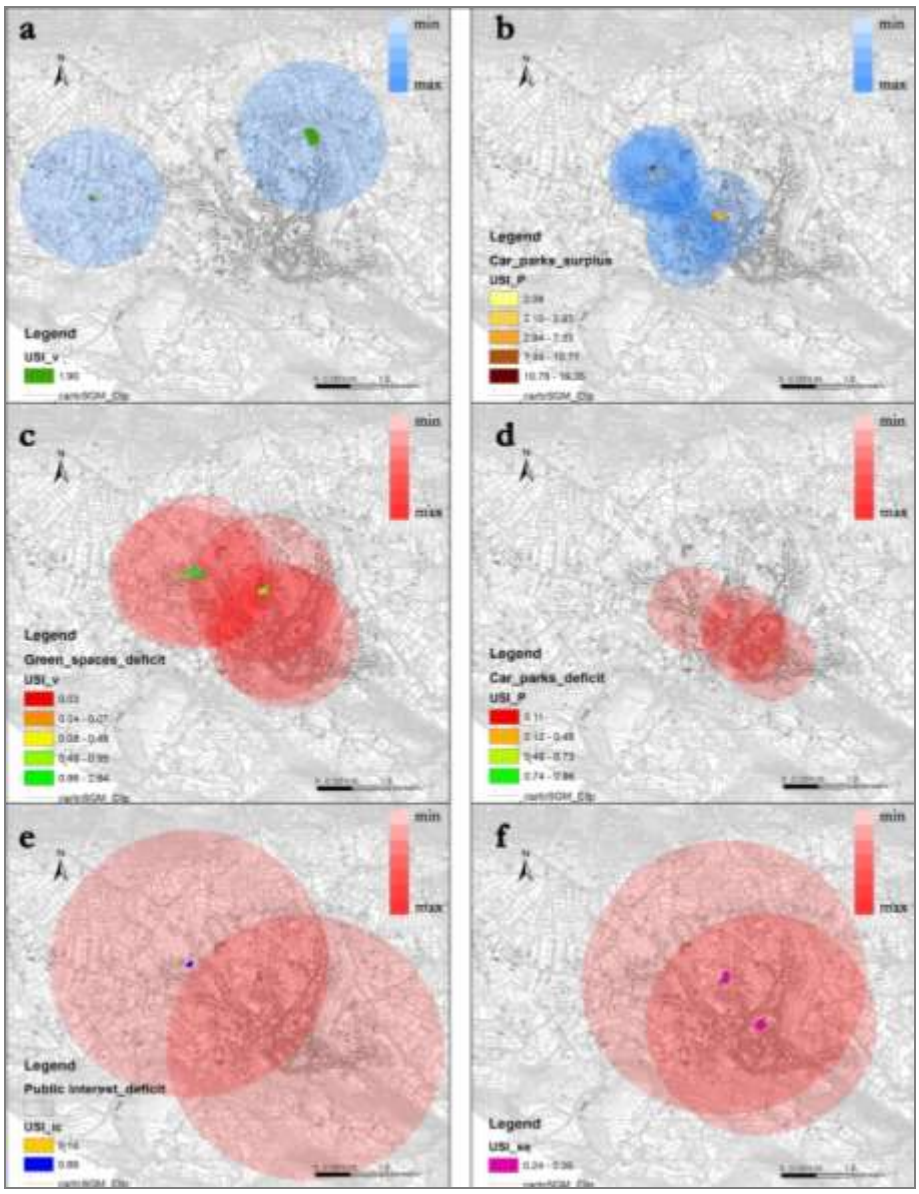


Figure 8.15 Application to the Municipality of San Gregorio Magno (Sa)

8.5.4 Identification of the strategic decisions of the municipal urban planning

The issue of enhancement of the municipalities in the inland areas must be addressed both in terms of urban and architectural conservation, and the overall quality and liveability, tying the preservation of existing assets to the issue of the use and land management.
The reorganization of the services and facilities is clearly guided by reasons of efficiency. In fact, in order to contain the growth of spending, there is a significant search for more efficient solutions to their organization, by trying to ensure best services (i.e. more effective services) to the citizens.
The tested methodology becomes a real method of verification of facilities of performance, starting from a database routinely built for the municipal urban plan.
The defined suitability maps identify one of the criteria of approach to the location choices in the municipal urban planning that must be combined with other criteria related to the sustainable urban transformation (Fig. 8.16).

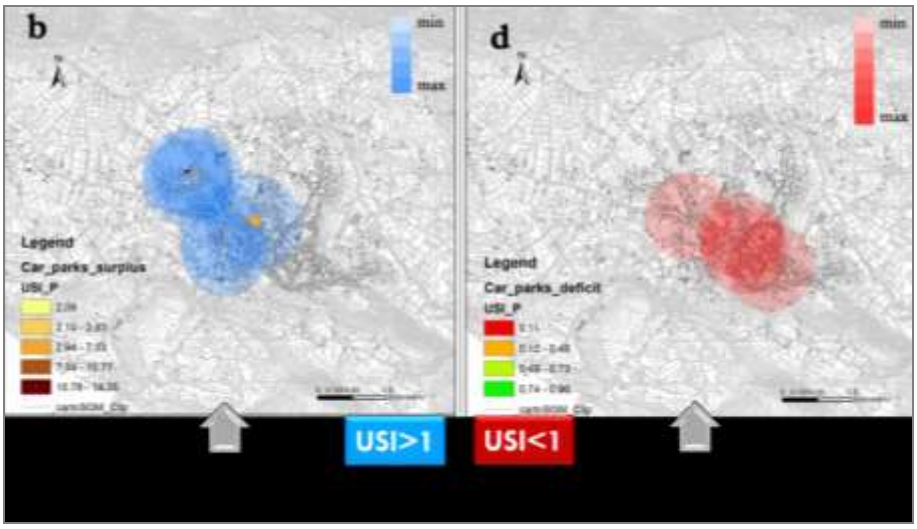


Figure 8.16 Approaches to the location choices

However, this criterion assumes special importance, since it helps significantly to the sustainability of choices. In fact, it allows the optimization of the existing urban structure from the economic point of

view, it guarantees the functional mixité per capita by raising the quality of life in social terms, and, in addition, it minimizes the impact produced by the new realizations from the environmental point of view.

8.6 OPERATIVE PHASE

The operative phase aims at identifying concretely the choices, setting priorities for action, share them with stakeholders, with the support of experts able to outline the guidelines for the subsequent implementation of individual areas that can house equipment or, more in general, that can be processed. In addition, it is characterized by the promotion and guarantee of the quality of the interventions and, above all, the construction of a consensus, shared by the local community.
While perfecting the decision on the future structure of the territory, therefore, consistent with the various moments of the landing of solutions and choices on the contents of the plan, specific problems of regeneration and redevelopment, or more generally of urban transformation, can also be addressed. In fact, they find their explanation and consistency in the general and operative planning and define the final solution in a clear, transparent and shared manner (Izzo, 2016).
Downstream of the studies pursued previously for this last phase of operative planning of services, the application of the Operational Research integrated with the GIS modelling has been essentially proposed. It is articulated through the following points (Fig. 8.17):

- subdivision of the municipal territory into lots and blocks, and their subsequent aggregation into meso-blocks and macro-blocks;
- analysis of meso-blocks and macro-blocks, and the determination of a function of localization cost;
- application of the set covering model by the Operational Research for the optimal location of facilities;
- recurrence of the model for the localization of the different types of services and the construction of a Map for Operative Design (MOD).

The innovative aspect is to estrange from the logic of zoning, but rather to consider the actual land uses, making use of the smallest units in the area and the effective distribution of the users of the services. It can be then defined a careful planning of services, which goes beyond the simplistic patterns dictated by law.

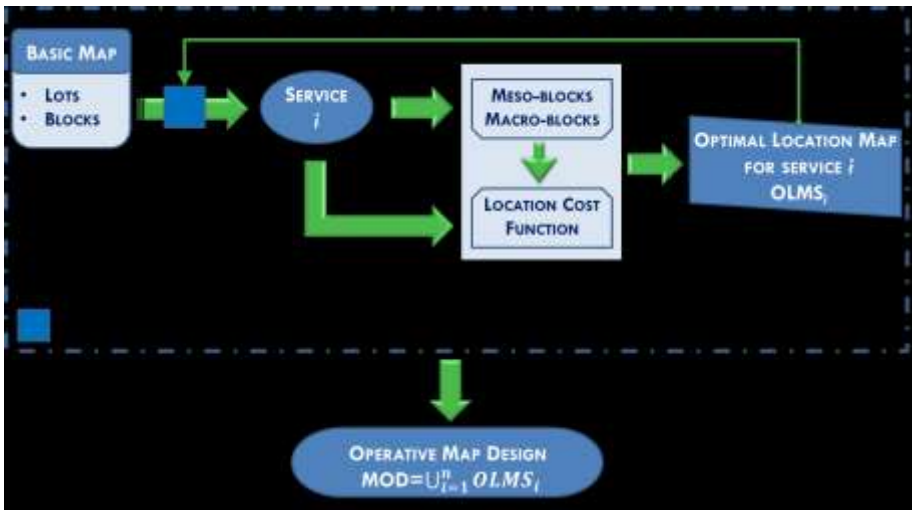


Figure 8.17 Diagram of the methodology in the operative phase

Moreover, through the methodology, it is possible to investigate the above mentioned issues, by assessing the effects over the blocks in which the equipment is located or by locating new facilities, also considering to the areas of neighbourhood and context. To define the width of the area that must be investigated at each level, there is the recourse to the lots, considered as the minimum spatial unit, which, according to requirements, must be aggregated in different ways.

8.6.1 Identification of lots and their aggregations

Affirmed the ideological failure of homogeneous territorial zones, which were based on the assumption that a city can be planned through the abstraction of the complexity of uses and functions that are present there (Falco, 1993), the research is aimed at defining new territorial units, with reference to the planning of services. Moreover, the recovery of the existing city involves the study of the close interaction between land uses and actual multiplicity of functions, which, on the one hand, does not complicate the problem slightly, but, on the other hand, allows the definition of the details of a place, that is lived and not abstract.
From these considerations, the idea of taking the basic territorial unit of the lot as a reference gets stronger. In the current practice of general

urban planning, the definition of the lots has already assumed a significant dimension, since it allows the detailed analysis of the existing situation and the understanding of the uses and functions in an area very accurately. Through on-site investigations, it is possible to define, as precisely as possible, the perimeter of the land area of each lot and its prevalent use. Moreover, the lot can be possibly divided into typological subclasses, where, in addition to the main function, secondary functions can be also identified.
Therefore the depth knowledge of the peculiarities of the places becomes essential also for the planning of services. For this reason, it is possible to identify all the lots in the municipal territory and to create a numbered and organized database, which combines the main function to each of them. In the built territory with high or low density, at this stage, it is possible to detect vacant, abandoned, landlocked or empty lots, which could potentially host new equipment or services. Through an iterative process, it is possible to proceed by lot to lot, with a binary check: if there is a space or an area with the above mentioned features, the application of the methodology proceeds, otherwise, there is the shift to the next lot until another lot, where it is necessary to operate, is found.
Starting from the spatial base, different types of combinations can be made, each of which has a different meaning from the methodological point of view.
First, the blocks understood as buildings or groups of buildings surrounded by public streets are identified. However, since this definition does not contain all the circumstances that were found in its application to real cases, other more elements of caesura have been added, such as highways, major suburban roads, the railways and the border with the agricultural fabric. The aggregation of the lots into blocks is necessary to reduce the nrmber of constraints to be considered for the application of the localization model which is expected to define.
So, in this phase, a grid of lots and blocks is defined in the municipal territory, and the pattern of what has just been described, with one example of a hypothetical urban fabric, is reported in Figure 8.18.
The lots, then, are again aggregated in order to identify the areas of neighbourhood and context of the blocks, respectively, through the definition of the *meso-blocks* and *macro-blocks*, which differ mainly in relation to the width of the area of influence of the equipment. The perimeter of the meso/macro-block is obtained through the

development of the perimeter of the lots that, starting from the area capable of housing the equipment, have any of the following features:

- they are adjacent to the source lot;
- their geometric centre point (centroid) has a shorter distance, with respect to the radius of influence of the type of equipment that is being considered, from the centroid of the source lot. The maximum distance for the meso-block from the centroid of the considered lot is 300 m, while the distance between the centroids of the lots is extended to 1,000 m for the macro-block[82].

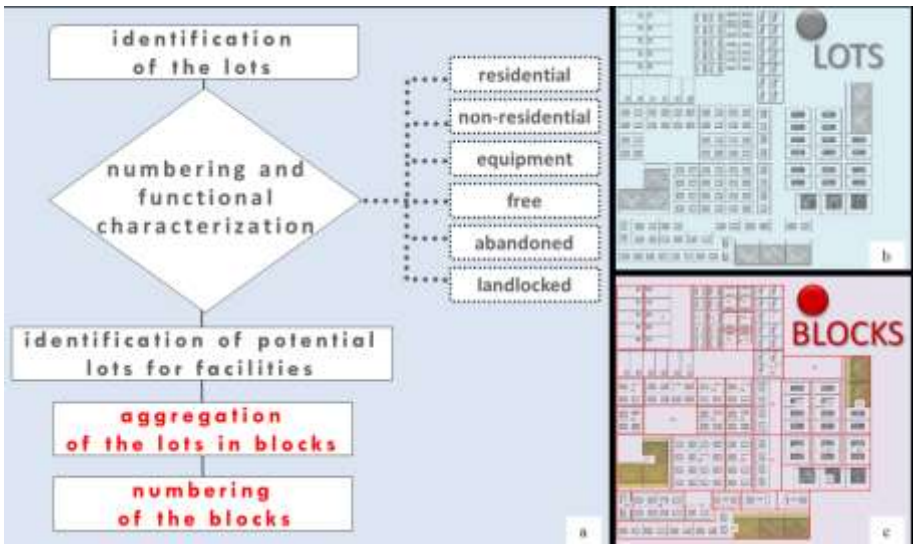


Figure 8.18 Division of the territory into Lots and Blocks: a. diagram; b. identification of lots; c. definition of blocks

Graphically, the procedure is made by the identification of the centroid of all the lots, the drawing of a circle, with a radius equal to the radius of influence to the type of equipment that is being evaluated, by the centroid of the source lot, and then the incorporation of the perimeter of neighbouring lots and all perimeters of lots whose centroid falls within the area of that circle, within the perimeter of the meso/macro-block (Fig. 8.19).

[82] The radius of action of 300 m corresponds to the distance travelled by a child at a speed of 3km/h for 6 minutes, while that of 1,000 m corresponds to the average distance of travel at a speed of 4km/h for about 15 minutes.

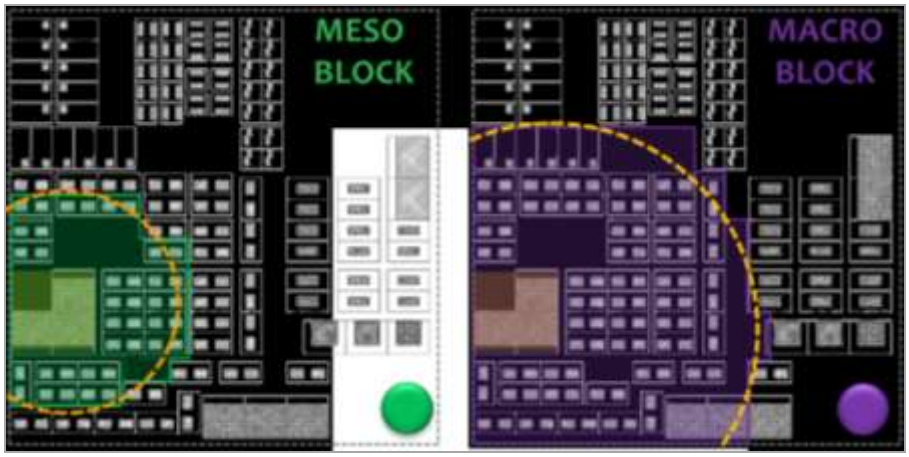


Figure 8.19 Construction of the scope of neighbourhood and context: meso-block and macro-block

The definition of these two scopes has the significance of association of lots to equipment starting from their areas of influence and thus allowing the identification explicitly of the lots that are not served.

8.6.2 The *set covering* model for the optimal location

The linear programming model of the Set Covering is the mathematical tool used for the localization of the services. Through this model, it is possible to define the minimum number of services that must be located to cover the areas in deficit, deriving from the previous phase. Through the minimization of an objective function, in which the binary variables that take the *1* value coincide with potential lots for new standards, it is possible to define the minimum number of equipment able to serve (to cover) the entire territory (Fig. 8.20).
Firstly, the set of the lots (*S*) and the *F* subset of meso/macro-blocks, depending on the service, that is being considered (in fact, they may also coincide with *MUS* or *SUS* defined in the preliminary stage, but such choice depends on the particular case conditions), are defined.
The variables of the model are represented by all the lots. They are binary variables, as previously mentioned, which can assume the value zero or one according to the presence or not of a facility that must be located.

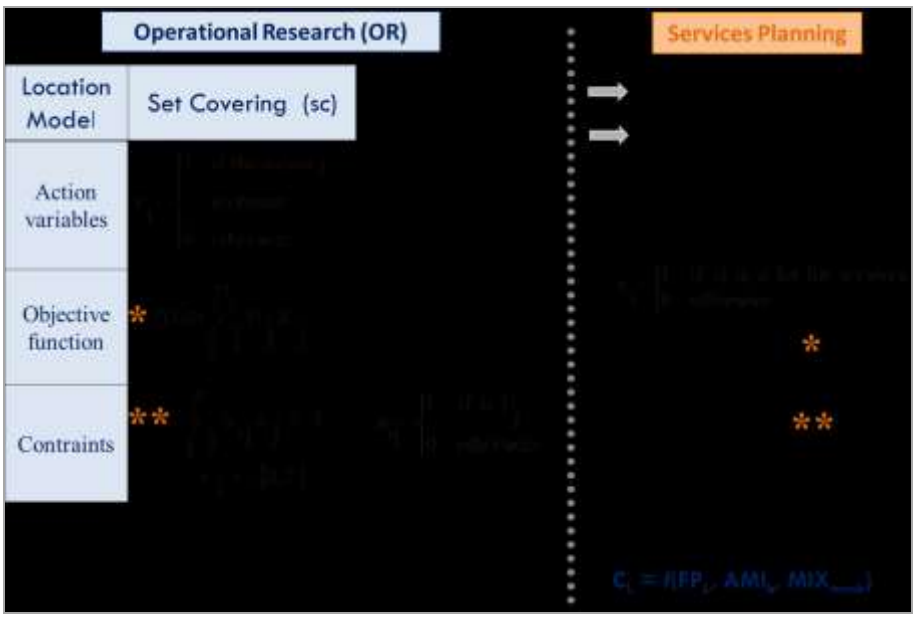


Figure 8.20 The Set Covering Model for the Services Planning

The idea is that a facility is able to serve (to cover) its block and all the lots belonging to its meso/macro-block. Therefore, defined the variables, the model is expressed through an objective function, which minimizes the number of variables with unit value, and the constraints, which must be able to represent the coverage problem. In particular, in addition to constraints related to the fact that the variables are binary ($x_j \in \{0, 1\}$), the technical constraints are made by several inequalities, whose number coincides with the number of the blocks. They are defined by the Kernel Density function, which allows the association between the centroids of the blocks and the centroids of lots, i.e. the x_j variables, which constitute the basic point pattern. This association is implemented in *GIS*.

In the objective function there are also some coefficients, which represent the costs, and that, in the specific case, will be referred to as localization costs. They are inversely proportional to the propensity of the lot to accommodate equipment, i.e. the greater is the localization cost associated with a given lot and the fewer is the possibility that the lot can host it effectively. If, on the one hand, this possibility stems from the fact that, through the cost function, the solutions with high costs should

be automatically discarded, on the other hand, it is necessary to remember that the eligible solutions do not depend on by the only costs, but by the combination of the defined variables and constraints.

8.6.3 The definition of the localization cost function

In general, the definition of the cost function in an *LP* model is a crucial moment, since considering several non-negative coefficients associated to the binary variables, it is possible to formulate different objective functions, that must be minimized or maximized, depending on the meaning of the coefficients. For example, the same model could be solved once with reference to a cost function and a second time with reference to a measure of the decision maker's preferences, by imposing, however, a threshold on the maximum level of sustainable cost. Alternatively, the same model could be used to analyse the different preferences of decision makers, by calibrating a same parametric objective function several times, each time with the feedback of preference of a different decision maker.
Even in the case of the location, the definition of the cost function takes on a significant role, as it becomes the expression of the physical, social, economic, symbolic, functional, temporal and environmental factors that must be remembered in the planning of innovative services. It is essential that the criteria, which influence the choice, are oriented to the urban, environmental and socio-economic sustainability of the interventions. The purpose is to identify, in relation to the considered most appropriate variables, lots with such characteristics which must be able to accommodate facilities, reducing the fixed and variable costs. All this can be translated into a focus on the sustainable planning of the municipal territory, through the consideration not only of town planning parameters but necessarily, also, of environmental and social quality parameters.
Following appropriate reflections, the propensity function for the location of the services was identified. From the urban point of view and in this specific case (planning of services), it depends on the physical and morphological characteristics of the lot, the accessibility of the block and the mixité of the meso/macro-block (Fig. 8.21).

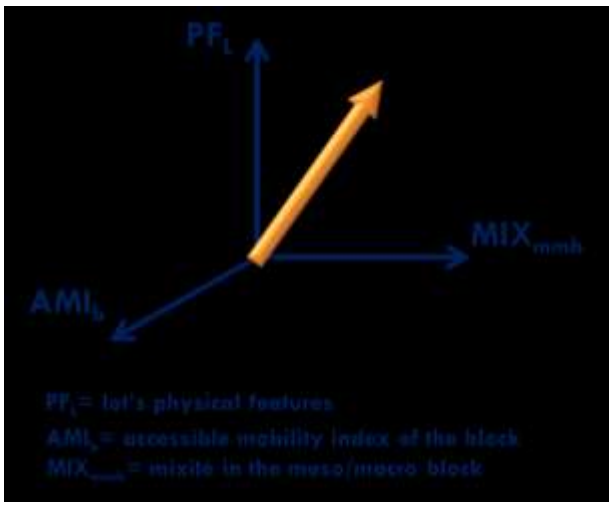


Figure 8.21 Propensity function for location of services

Since this function expresses the attractiveness that a lot can exercise for the location of a service, in the set covering model it must be evaluated inversely, because the higher the value of the propensity in the relevant lot is, the lower the cost for localization of the service is. So, the cost function for the model will have the following aspect:

$$C_L = \frac{1}{(PF_L, AMI_b, MIX_{mmb})} \qquad [8.8]$$

The measure of the propensity function is based on a set of indicators.
A thorough literature review generated a list of candidate variables and metrics, that has been shown to be relevant to perceived propensity function for the location of services. However, the candidate variables were restricted to those for which suitable data sources were readily available in our setting.
The physical characteristics of the lot are evaluated through metrics (Tab. 8.6) that result from Landscape Ecology[83]. It references to its size, which is normalized with respect to the total area that must be allocated

[83] Discipline of ecology and physical geography that studies the spatial distribution of the elements in the landscape.

to equipment provided by the law, to the configuration, in terms of the coefficient of form, through the ratio of the perimeter of the lot and that of an equivalent circle, and finally, to its position with respect to the block, by evaluating the ratio of the distances between the centroid of the lot and that of the block and the maximum distance between two points of the boundary of the block.

Table 8.6 Selected metrics for the description of the lot

Indicator	Index	Metrics	Formula	Description
PF_L	**dimension Ar**	related area	A_L/A_T	A_L: area of the lot [sq.m] A_T: total area by DI no.1444/68 [sq.m]
	shape Sc	shape coefficient	P_L/P_{ec}	P_L: perimeter of the lot [m] P_{ec}: perimeter of the equivalent circle [m]
	position Dr	related distance	D_{LB}/D_{maxB}	D_{LB}: distance between lot-block centroids [m] D_{maxB}: maximum distance in the block [m]

Then, the accessibility features of the block are evaluated through the indices related to different ways of displacement (Tab. 8.7).
First, the index of walkability is defined. By measuring both form and content of blocks, walkability indices are expected to measure the degree corresponding to an area able to provide opportunities to walk towards various destinations. Several indices have been developed to measure walkability, combining aspects of the built environment that promote or inhibit walking (Ewing, et al., 2003; Frank et al., 2005; Frank et al., 2006; Krizek, 2003; Cervero and Duncan, 2003). These indices commonly include measures such as residential dwelling density (Frank et al., 2005; Lee and Moudon, 2006; Li et al., 2005; Moudon et al., 2006; Frank et al., 2010) intersection density (a measure of street connectivity) (Frank et al., 2005; Li et al., 2005), density or proximity to walkable destinations (Lee and Moudon, 2006; Moudon et al., 2006) and land use mix (Frank et al., 2005; Frank et al., 2006; Frank et al., 2010; Frank et al., 2007). Generally, it is common for researchers to tailor the development of an index based on the availability and quality of built environment data for their study area. Therefore, following a considerable literary review, the construction of the walkability index for the location of services has led to consider

the relative population sizes, the density of houses, covered areas destined to green and connectivity. Particular attention was paid to the definition of the connectivity index, which evaluates how well a roadway network connects destinations. It is computed by dividing the number of roadway links by the number of roadway nodes. The links are the segments between intersections, i.e. the nodes. A higher index means that pedestrian travellers have increased route choice, allowing more direct connections for access between any two locations.
Similarly, accessibility also depends on public and private transport. For this type of accessibility, it is, therefore, necessary to evaluate the indexes that are closely connected to the infrastructure, related to the different ways of displacement in the neighbourhood and in the context of the block.
Less research time has been spent on the development of bike-ability indices than for walkability. Two indices (Eddy, 1996, in Emery et al., 2003; Harkey et al., 1998) are calculated in quite complex formulas, with many different components, such as street condition, road and street facilities measured by audits. Recently, in 2013, Winters et al. defined a bike-ability index that uses *GIS*-data to quantify its five components, namely, bike route density, bike route separation, connectivity, topography, and destination density. Apart from topography, it was assumed that all the components were positively related to cycling. From this literary review and performing suitable simplifications for the evaluation of the propensity function, the bikeability index can be then defined. It represents the accessibility in a given area as a function of its topographical features, in terms of topographical inclination, and physical characteristics: i.e. dedicated infrastructures necessary for the displacements with the use of the bicycle.
The latest index for accessibility is the mobility index, which specifies how the neighbourhood and the context of the block are served by infrastructure that enables the use of public transport, through the assessment of the average distance of the stops of these means, or the use of private vehicles, by evaluating the average distance among the public car parks. Both distances are defined on the real infrastructural network.

Table 8.7 Selected metrics for the description of accessibility of the block

Indicator	Index	Metrics	Formula	Description
AMI_b	**walkability (WI)**	population ratio P_r	P_B / P_{mmB}	P_B: no. of inhabitants in the block [inh./ha]; P_{mmB}: no. of inhabitants in the meso/macro block [inh./ha].
		dwelling density ratio dw_r	dw_B / dw_{mmB}	dw_B: dwelling density in the block [dw./ha]; dw_{mmB}: dwelling density in the meso/macro block [dw./ha].
		area ratio A_r	A_{cB} / A_{mmB}	A_{cB}: covered area in the block [sq.m]; A_{mmB}: total area of the meso/macro block [sq.m].
		the green element of furniture A_{gr}	A_{gB} / A_{gmmB}	A_{gB}: green area in the block [sq.m]; A_{mmB}: total area of the meso/macro block [sq.m].
		connectivity C	S_{mmB} / N_T	S_{mmB}: no. of streets in the meso/macro block; S_T: no. of nodes in the meso/macro block.
	bike-ability (BI)	topography	$\bar{I}_{bmmB}$	average inclination of the meso/macro block [%].
		bycicle lenght ratio Bl_r	L_{bmmB} / L_{bT}	L_{bmmB}: bycicle paths' lenght in the meso/macro block [m]; L_{bT}: total bycicle paths' lenght [m].
	mobility (MI)	car parks distance	$\bar{D}_{cp}$	the average distance between car parks in the meso/macro block [m].
		public transport stops distance	$\bar{D}_{pts}$	the average distance between public transport stops in the meso/macro block [m].

Finally, in the scope of the meso/macro-block, it is possible to define the third indicator for the propensity function, i.e. the mix of services MIX_{mmb}, defined as a combination of four indices (Tab. 8.8):

- MIX_f (functional mix) is a measure of the concentration of services in a particular area, corresponding to the levels of meso and macro blocks;
- MIX_t (typological mixité) describes the need that various types of facilities must be located within the meso/macro block. It is a measure of the number of different services within a given area. Similarly to the density of services, the higher is the number of types of services, the greater is the level of opportunity within a given area. In this research, the typological mix is measured in terms of entropy. The entropy equation can be found in the environmental literature, where it is referred to as the *Shannon Index* and is used to measure the diversity of animal species (Spellerberg and Fedor, 2003). The values of services mix (or entropy) range from *0* to *1*, with lower service mix buffers (i.e., buffers with more homogeneity of services) having values closer to *0* and buffers with greater services mix having values closer to *1*.
- MIX_s (social mixité) can be defined with respect to the percentage of buildings for social housing with respect to the different types and forms of living. In fact, it is better to create small public housing units spread throughout the city, rather than concentrating them in one wide and confined place.
- MIX_h (temporal mixité), that evaluates the timing and times of delivery of services and other activities compared to 24 hours of the day. The temporal mixité is also the basis of the definition of vitality since it guarantees the constant presence of people, who are in the neighbourhood or in the context for several reasons. In fact, not only the residents but also people from other parts of the city can have the need to use the considered services or activities inside the unit. The mixing of different land uses and the offer of services helps to create a viable, safe and attractive environment for a wide range of people and produces the spontaneous control, with the consequent increase in social security.

Table 8.8 Selected metrics for describing the mixité in the meso/macro-block

Indicator	Index	Metrics	Formula	Description
MIX_{mmb}	**functional MIX_f**	services density ratio	$\sum D_{Si} / D_{T,S}$	D_{Si}: density of the i^{th} service [s./ha]; $D_{T,S}$: density of all services [s./ha].
	typological MIX_t	facilities entropy	$-\sum[P_n \times \ln(P_n)] / \ln(N)$	N: no. of different types of services in the meso/macro block; P_n: the proportion of sq.m of the i^{th} service within the meso/macro block.
	social MIX_s	related social housing	H_{smmB} / H_{mmB}	H_{smmB}: no. of social housing in the meso/macro block; H_{mmB}: no. of houses in the meso/macro block.
	temporal MIX_h	related activities	$\sum_i h_{i,fmmB} / 24 f_{mmB}$	$h_{i,fmmB}$: hours of working on the activity i per day in the meso/macro block; f_{mmB}: no. of activities in the meso/macro block.

The function of propensity, and therefore its inverse (localization cost), is evaluated through a Kernel Density Estimation, implemented in a *GIS* environment.

Considering the lot as a spatial occurrence of the considered phenomenon, it is possible to switch to the calculation of the various indicators through the Kernel Density Estimation method. The lot event, represented by a polygonal primitive, is transformed into a primitive of punctual type, thus identifying the point pattern of origin. Then the definition of the size of the cell and the bandwidth follows.

The result is a factor map representative of the spatial distribution of the values of the indicators of the propensity function, relatively to the event and the considered parameters.

8.6.4 Application of the operative phase to three different scenarios

The operational phase has been applied to the municipality of San Gregorio Magno, whose inhabited core is located in hilltop position. Assessed preliminarily a significant deficit of urban standards per capita, it is necessary to outline a project of related services within the settlement, pursuing the ultimate goal of unity and integration, with the following improvement of the quality of life of the local community and the welfare of citizens.

The analysis studies for the system of knowledge, made for the editing of the structural part of the Municipal Urban Planning, under the scientific consultation of the Department of Civil Engineering of the University of Salerno, provide a consistent database necessary for the application of the third phase of the methodology for the planning of services. First, the database defined in the structural phase of the methodology is confirmed and other information is added, related to the use of urban land, allowing the identifications of all lots and the understanding of the different functions in each lot.

Defined the deficit of equipment within the urban fabric, the first thing to do is to locate all the vacant, empty, landlocked and abandoned lots, which may be occupied or converted respectively into spaces for new equipment. In the case study, for its morphological and structural features, all lots were considered having a minimum area of 500 square meters, with a maximum gradient of 8%. The next step is the aggregation of lots into blocks. The map of Figure 8.22 shows the defined database, with details of all the equipment in the municipality of San Gregorio Magno, of all the lots, equal in number to 1,017, of 76 potential lots that could accommodate new equipment and of 97 identified blocks. This map also contains other designed equipment, that has already been designed and approved as part of implementation plans or projects put in place by EU fundings.

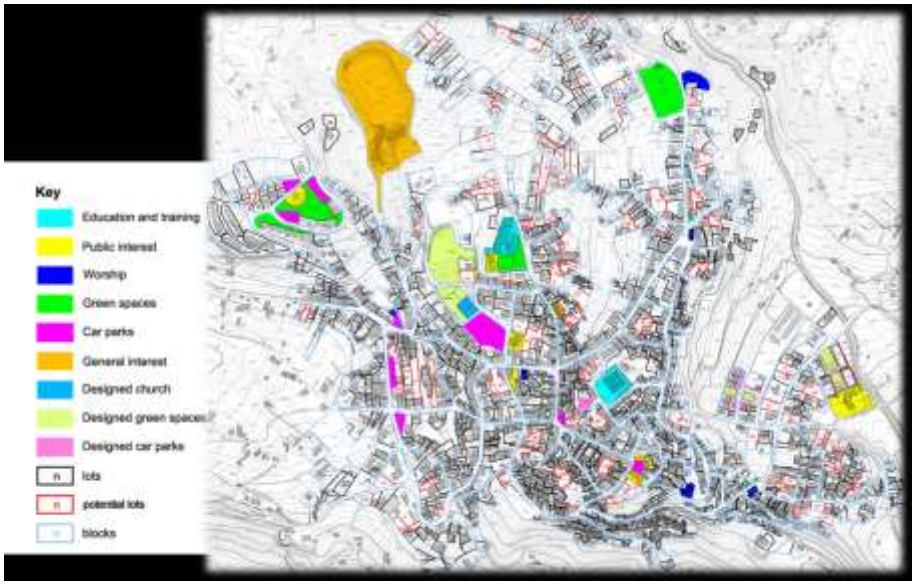


Figure 8.22 Data set framework

The aggregation of the lots in meso/macro-blocks follows. Both lots and blocks, which are represented by polygons, are transformed into points, corresponding to their centroids. The Kernel Density function allows the identification of the meso/macro-block by associating the centroids of the lots that fall within a defined buffer to the centroids of the blocks. This combination will allow the setting of the inequalities of the constraints in the set covering model.

Given the complexity of the system of territorial division and aggregation, the application of the methodology will continue with reference to the implementation of the car parks facilities, as a continuity with the example in the structural phase, that will allow the evaluation of further considerations. For these facilities, buffers with radius 300 m[84] from the centroid of the blocks will be considered (Fig 8.23).

[84] For a more accurate assessment, it should be defined the population density that can use the equipment, followed by the evaluation of corresponding radius of influence.

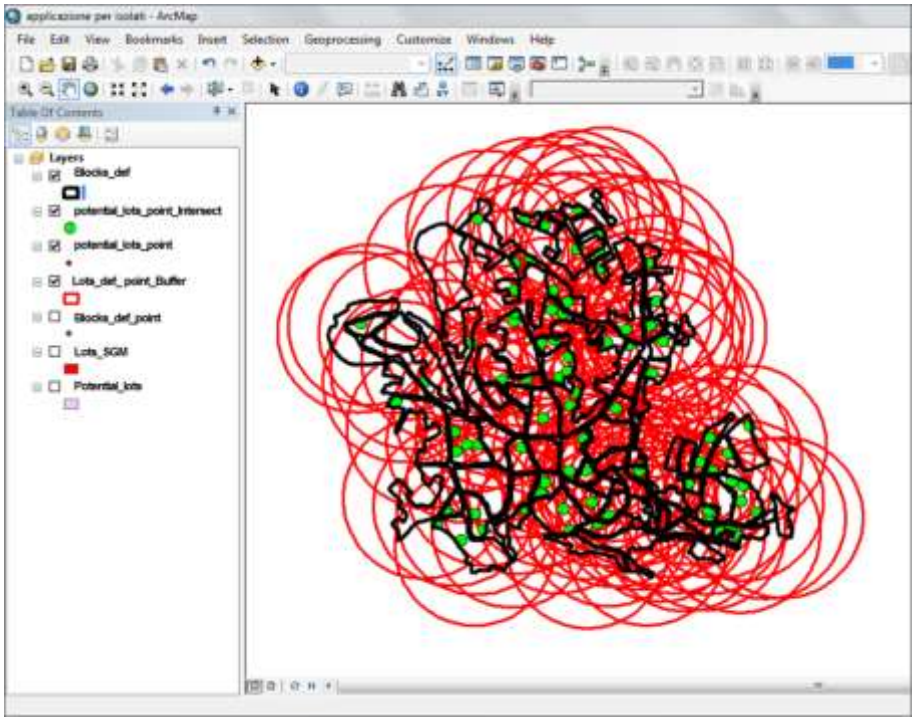


Figure 8.23 Aggregation of the centroids of the lots to the centroids of the blocks

Moreover, the localization cost function is assessed through the kernel density. From the basic point pattern, that coincides with the lot, it is necessary to define the cell and the bandwidth. For the definition of the size of the cell, it can be studied the frequency distribution of the areas of the lots, by choosing a cell size able to contain one lot on average. Instead, for the definition of bandwidth, which affects the result significantly (Bailey and Gatrell, 1995), there is a reference to the definition of the inhabited centre provided by the New Highway Code (DLgs no. 285/1992) and of inhabited places by the National Institute of Statistics (Istat). The decree defines the city as a continuous grouping, albeit interspersed with streets, squares, gardens or similar, consisting of a number fewer than 25 buildings and areas of public use with vehicular and pedestrian access on the road. The Istat (n.d.), instead, defines the inhabited places as "an aggregate of contiguous or neighbouring houses with roads and squares, and, however, brief solutions of continuity for the determination of which a variable value of 70 meters is assumed

approximately". Combining the two definitions, it has been possible to define a bandwidth range of 100 meters (Gerundo and Grimaldi, 2009). Finally, it is possible to draw the factor map of the costs for the different lots.
It is now possible to set the set covering model and, using a resolver, to find the solution that respects the constraints and the optimization conditions (Fig. 8.24).

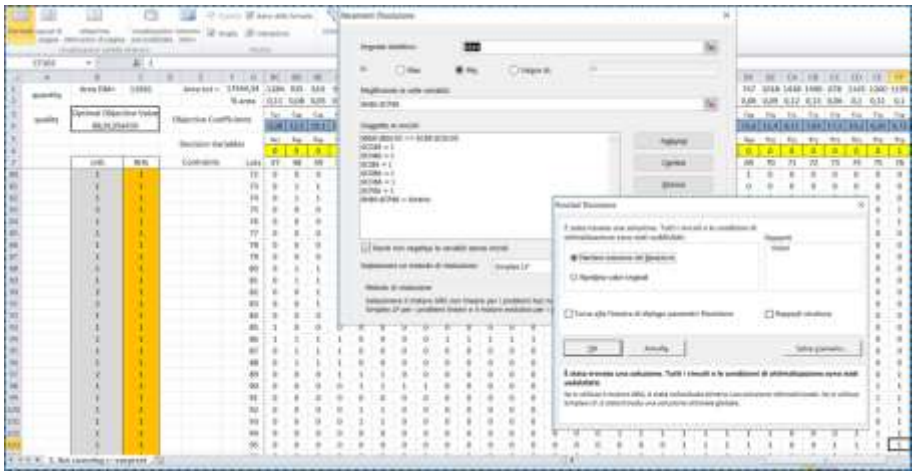


Figure 8.24 Calculation model of the set covering

With regard to car parks, the methodology has been applied to different scenarios. This has led to different solutions, both quantitatively and qualitatively. The defined scenarios are:

- Scenario 1, which is characterized only by the potential lots;
- Scenario 2, which considers as variables: the potential lots, the actual car parks and the projected car parks, already approved;
- Scenario 3, which considers the potential lots and the actual car parks, which resulted oversized from the structural phase.

The configured solutions of the three scenarios (Fig. 8.25, 8.26, 8.27), resulting in the application of this third phase of the methodology, however, must comply with the regulatory requirements in terms of quantity, which, valued at 2024, corresponds to 11,661 sq.m. of land area to be used for car parks.
Scenario 1 (Fig. 8.25) can be compared to a scenario for the design of new services since it challenges completely the actual configuration of

the car parks, which are automatically rejected. However, while, on the one hand, it defines an optimal solution of coverage of the whole inhabited centre, on the other hand, considering only the potential identified lots, it does not guarantee compliance with the minimum amount required by the law.

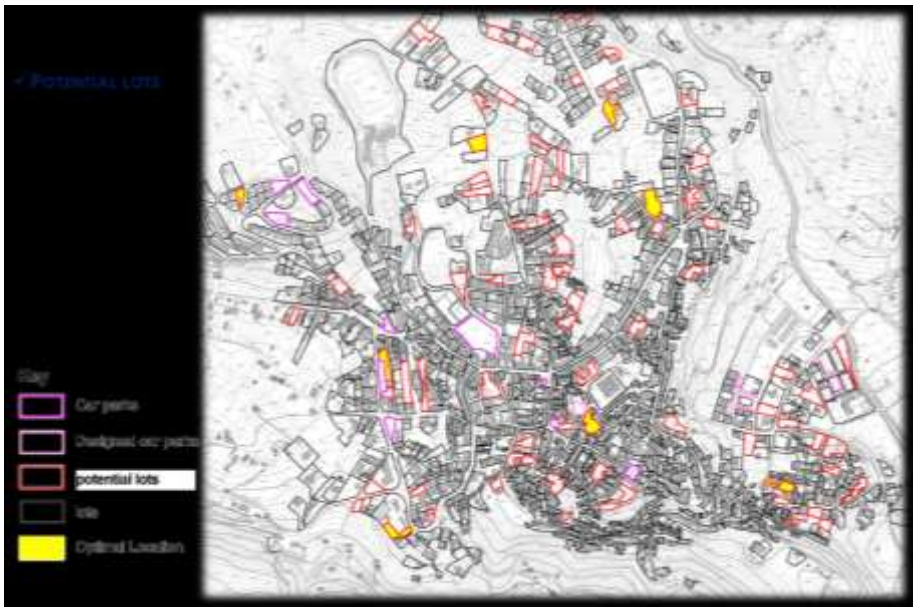


Figure 8.25 Scenario 1

Scenario 2 (Fig. 8.26), that can be understood as an implementation scenario for the services, produces an optimum solution from both the qualitative and quantitative point of view. However, the solution does not fit any of the new car parks already designed, which would not seem to have any influence on improving the provision of the service.
Finally, Scenario 3 (Fig. 8.27), also of implementation of car parks, defines a configured solution which reconfirms all the car parks evaluated as oversized in the previous phase, except for only one. Moreover, in order to confirm the over-dimensioning of the car parks, this scenario produces the total land area for car parks greater than the other two scenarios.

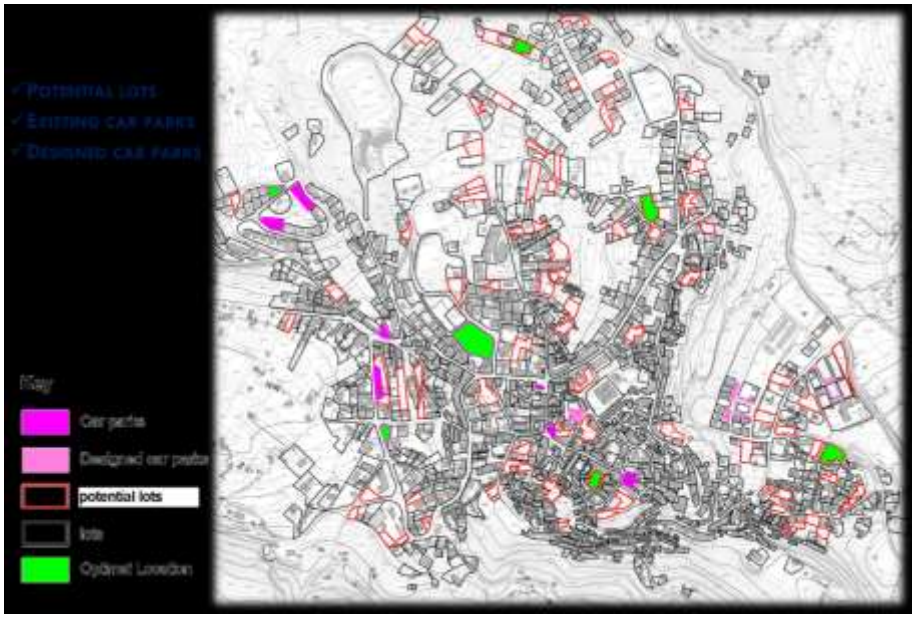


Figure 8.26 Scenario 2

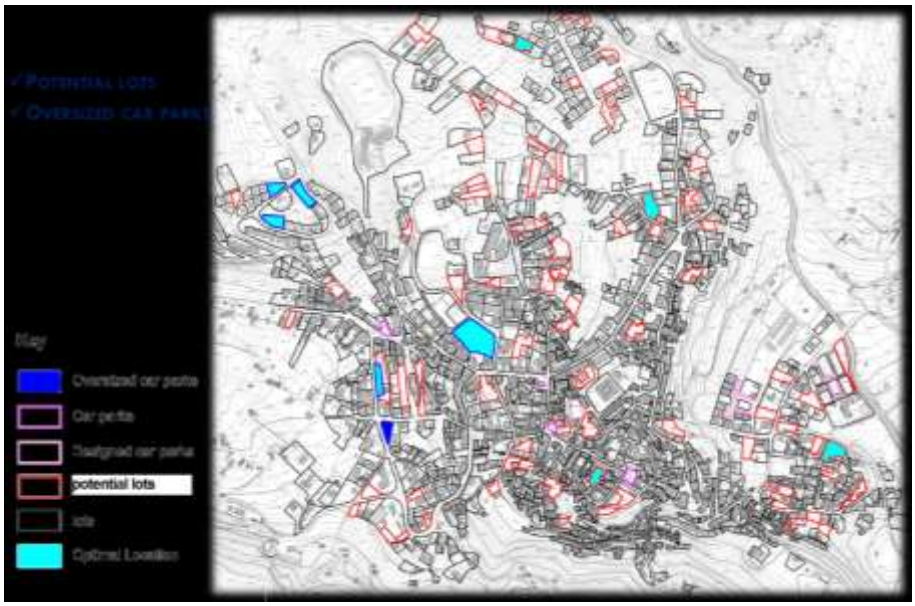


Figure 8.27 Scenario 3

8.6.5 Discussion and results

The latter part of the methodology, tested in the municipality of San Gregorio Magno, mainly proposes a method for locating services based on quantitative and qualitative rules, which is outside the zoning practices but, instead, is based on actual land uses, through a planning of services based on the lots.

The integration of the Operational Research model with spatial analysis tools allows the achievement of optimal solutions, through simple operations and by using the data that are normally acquired in the process of urban planning. It also provides a systematic method of implementation of the contents of the municipal urban planning, through techniques of localization of services, which are supported by an easily implementable system of indicators and are related to different geographical areas. Then, through the recurrence of the application of the model, it is possible to design the *Operative Map* (*MOD*) of services.

The obtained results highlight a number of issues which give rise to further developments and of problems that should be corrected by testing the model on different realities.

First, the evaluation of the radius of influence of the facility that should not take into account only the population density, but also the accessibility to the service. Specifically, it could be considered a population limit, always related to the legislation provision of equipment, with respect to which a variable area of influence can be defined, also depending on accessibility.

With regard to the model, in addition, it would be appropriate, without the recourse to the context and the neighbourhood necessary for reducing the number of constraints, to act exclusively on the lot, through the use of more sophisticated software for solving the inequalities, or to apply the model for parts of the territory with appropriate overlaps.

Finally, the assessment of localization cost function may depend on additional indicators, which can reflect the social, cultural, economic, physical and environmental places. This produces the definition of sub-optimal solutions. For this reason, it is necessary to test the model on different settlements in order to identify other possible indicators and assess their weight.

8.7 THE MANAGEMENT PHASE

In designing the system of services, both in its traditional sense of adjustable space within itself and in its innovative meaning of generating principle of new urban settings, it is especially important to consider the implementing conditions and the management of interventions (Clementi, 1983). The lack of consideration of the management processes for equipment, characterized by insufficient resources and skills, is a major cause of failure of their functioning. In line with the trends of defining qualitative parameters in addition to the quantitative ones, the redefinition of the standards for the equipment focuses on the theme of management both within the regulatory instruments and at the level of managerial structure of each equipment. The consequences of the continuation of this situation produce a particular interest not only in physical and functional predictions but also in the political and administrative ones. Therefore, the attention is focused on the integration between the physical and functional design and the management planning, that has to occur in its feasibility at the governance level. It is necessary "to understand the role played by the procedures, rules and institutional mechanisms in relation to the possibility of local and contingent conditions in which each instrument has to operate" (Pasqui, 2005).

Once again, the mutability of the demand for the service and equipment determines the change in its management mode Having to combine the need to meet the demand of the territory and taking care its monitoring and updating constantly, with the trend to the need for integration of sectors, it is obvious that the organization of the services' management becomes in constant evolution and experimentation. At the same time, it is necessary to link the services' planning with the Triennial Program of Public Works and the Executive Management Program (technical-economic planning tools of the Municipal Administration) annually, in order to define priorities for action in line with the available budget.

In this scenery, the relationship established between those responsible for the services and facilities and the local population assumes great value. There is the return to the collective discussion and participatory evaluation of the entire design process: the more the residents are involved in the programmatic and projecting phases, the more they will be involved in the co-management. In fact, the processes of transfer of competencies relating to the services and thus of self-promotion and

self-management, are not predictable a priori but induced by favourable conditions built during the design process.
In addition to the active involvement of the local population, a second element, that must be considered for the revision of traditional management models, is the use of public-private partnership models. This relationship is characterized by positive aspects, but also by difficulties. In fact, by easing the managerial and financial burden of the public entity, the result will be a greater efficiency of the service, also if it will become a source of income. On the subject of private interventions in the structuring the territories there is a considerable number of literary contributions, particularly in last recent years in Italy[85]. In this context, the intention is not to discuss the subject in its entirety, but only on the introduction of new management formulas, which may have affected in regard to the concept and design of the equipment. The joint participation of public and private entities, however, can be a favourable condition for the activation of self-managed structures, above all in the social sector.

8.8 SUMMARY EVALUATION OF THE METHODOLOGY

It is reasonable to think that it is possible to reverse the relationship between housing system and service system, attributing to the services the role of generator system not only of functional structures and overall urban quality, but also of the territorial articulation of the new settlement forecasts, based on a verification of urban and environmental sustainability, conducted upstream of the planning choices. If set in this way, the design of the system of services becomes the design of the frame on which the city can be redeveloped and on which it is possible to concentrate the meanings and values of greater social significance. Continuity, completeness and recognisability of this frame allow the articulation of the city into parts, without losing the sense of the whole.
Through the application of the described methodology, that is structured in phases accompanying the entire process of urban planning and that

[85] The reference is made in particular to the literature on companies of mixed management and urban transformation introduced, in Italy, by the L. no.142/1990 (companies with public majority), by the L. no.498/1992 (companies with public or private majority) and by the L. no.127/1997 (limited companies to design and implement urban transformation projects in implementation of existing planning instruments).

interacts continuously with the social and environmental aspects, it is possible to determine, for each local area, specific elements for the identification of intervention policies, which may be of:

- the increase in supply, where it is deficient, compared to the expected demand;
- strengthening of the current structure, in correspondence of an adequate qualitative and quantitative supply;
- the increase of urban predictions for settlements or the reuse/disposals of properties, in the parts of the territory where the equipment are oversized.

These policies are intended as a series of widespread and detailed interventions, for which it is necessary to work operationally to micro-scale so that people have the time to get used to the changes. Only after that the intervention has been received and accepted, it is conceivable to extend this policy to other areas, in order to cover the whole urban territory.

8.9 CHAPTER SUMMARY

Chapter eight has defined the methodological proposal for planning services and facilities. The defined methodology consists of three phases in such a way that it can be integrated with the practice of municipal urban planning, that, already, is widely recognized by law. Moreover, it is integrated with participatory processes, which, according to their position in the 3-phases methodology, can be considered as tools of knowledge of the problems of a territory and the people's needs, and instruments of validation of the model.

Through different input and the use of the techniques defined in chapter seven, the outputs are both strategic and operative respectively. From the first phase, that was applied to the municipality of Castel San Giorgio (Sa), a scenario of possible actions for future strategies can be defined. The output of the second phase is the identification of land areas with a deficit of facilities, through the development of a GIS-based spatial index built on population and influence area indicators, applied to the case study of the Ancient Volceij planning process (South Italy). The third phase, applied in the municipality of San Gregorio Magno (Sa), allows the definition of the optimal location of facilities in order to serve

and cover the entire municipal territory. The chapter has also focused on the management phase and the subjects that must be involved.
The thesis will finish with chapter 9 which, after a summary of all the aspects which characterize the urban standards, will define how the methodology can support the planning choices. Moreover, it will identify an evaluation of the limitations of the research and how they might be overcome with future work.

9 CONCLUSIONS AND SUGGESTIONS FOR FUTURE WORK

> "… With cities, it is as with dreams: everything imaginable can be dreamed, but even the most unexpected dream is a rebus that conceals a desire or, its reverse, a fear. Cities, like dreams, are made of desires and fears, even if the thread of their discourse is secret, their rules are absurd, their perspectives deceitful, and everything conceals something else…".
>
> (Calvino, 1972: 42).

The re-design and re-qualification of the territorial endowments, which are necessary because facilities are insufficient, badly built and designed and poorly managed, require the integration with a concept of urban quality, which can only be revived according to new rules and updated methodologies. Wellbeing varies with location, and maps indicate which part of the population enjoys this, and where (Smith, 1973; Coates et al., 1977). Therefore, urban planning can provide mechanisms of resource distribution and increased spatial justice (Smith, 1977; Soja, 2010) and decision-making processes about where to locate services are crucial in any society.

The last chapter of this thesis (Fig. 9.1), after an overview of the core aspects of panning urban standards, focuses on the important role of the innovative methodology of the research, that is able to support decision-making processes, and finishes with suggestions on its improvements and future developments.

9.1 BACKGROUND CONTEXT

The services planning of a territory is complementary to the planning of its development, often, indeed, preceding it and, consequently, the

assessment of the total endowments in a territory, in terms of services rendered to the population and user, is crucial to define its structure. In these circumstances, researchers, engineers, planners and administrators are aware that the standard is a tool to achieve the urban quality.

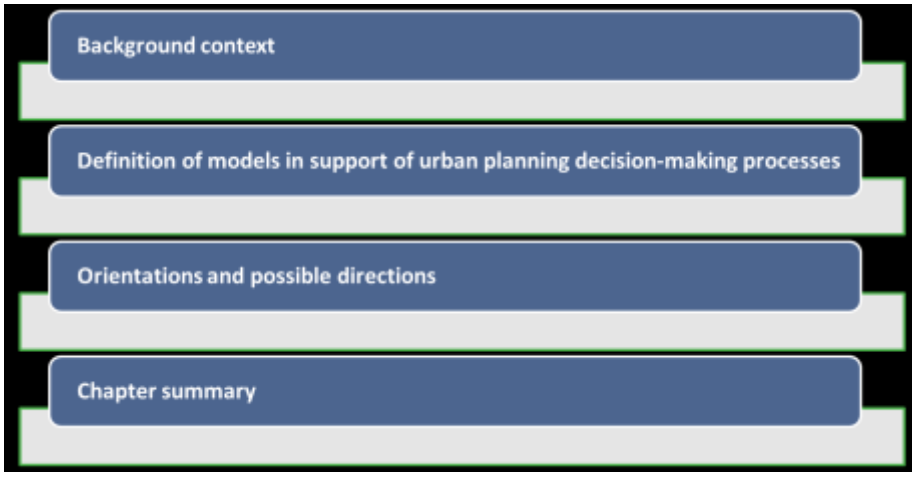


Figure 9.1 Chapter 9 diagram

Similarly, Viviani (2016) defines "the urban standards ... [as] a cultural and social achievement to be defended, which can be adapted to the prospect of improving the city". For the city in the expansion, in the general urban plans of the twentieth century, this aim could be achieved by providing for minimum endowments of space for facilities and services. However, this conquest of urban culture must be made functional to the city, which has to be retrained in the new millennium. It is necessary then to switch the standards designed for the growth of the city to the facilities for the quality and for the recovery of the various urban forms, the destinations of usage to the activities, the predetermination of the structure to environmental suitability, pre-quantification of spaces to their reconfiguration. Overcoming thus the old concept that the equipment is too often detached from the logic and the evolutionary dynamics of the local reality, the assumption of responsibility of infrastructural quality of the local area by structures that include new spaces, new functions, new operators capable of being active in various stages (program, project and urban transformation

management), can help to define the "local field" (Calvaresi, 1999) useful to redefine the identity and image of the territory.
At present, therefore, research must focus on an urban quality measured on the basis of other indicators. It is necessary to integrate the quantitative measure with parameters of quality and performance, used to generate public value, to ensure the eco-systemic functionality of environments conducive to the holding of human activities, and to respond to new needs. Not only research but, also, the experimentation must start from the need to translate the quality in terms of quantity or parameters. In short, it is important to highlight that the introduction of parameters for each standard allows calculating the actual service offered, by quantifying the quality (ibid.).
The relation among service, facility and environment cannot be reduced to arguments related only to the physical demand of equipment. In fact, the analysis of the real demand and reflection on the changes of the physical space relative to local scale facilities for public services determines their quantification in standard measures and must necessarily be related to a rethinking of the concept of public service and welfare at the local scale. It is, therefore, necessary to try to define the benefits that the city is actually able to offer its citizens, distinguishing the concept of facility (the building) from the service (the delivered product), even without administrative restrictions (service provided in another municipality different from the one whose citizens can enjoy it) or any rigorous urban destination. This means to field issues relevant for urban planning discipline, always guaranteeing democratic treatment in terms of urban public services, since it is called upon to provide technical and appropriate disciplinary responses to the real needs of the population settled in the territory.
Moreover, the framework of facilities and collective services must evolve toward interconnected systems of welfare measures, not exclusively public. Such systems qualify the processes of urban regeneration, and must also be studied in relation to their designing effects which, in relation to the main purpose, can be considered (Nespolo, 2012):

- a careful design to the intrinsic characteristics of the places, the fixed components and the elements of identity, replacing degraded areas, or in continuity with the existing residential areas and/or with the consolidated urban tissue, in order to avoid the prevalence of certain social groups (immigrants or vulnerable users), which can determine the segregation or the formation of single-purpose areas or gated

communities, both physically and socially. A possible strategy of requalification at the neighbourhood level should, therefore, provide diversified and integrated equipment, designed specifically for each local context, with facilities dedicated to the delivery of services that include within them the presence of multidisciplinary expertise;
- the social protection measures, which must be varied suitably in order to adapt to the complex contemporary urban social structure, and must include the identification of proximity services in whole or in part self-managed by the residents (Doria, 2006);
- in urban transformations the expansion of the types of community facilities of utility also entails the adoption of measures to implement the local economy through the inclusion of activities compatible with the environment, such as the creation of spaces to be allocated to companies local craftsmen or structures capable of hosting incubation activities for business, research and development.

In addition, particular attention should be given with respect to the ten principles contained in the proposed Chart of Services (Chapter 6), stressing that the design process should be supported by a series of immaterial actions, such as integrated policies and practices of inclusion and participation. Today, no community accepts planning that ignores or underestimates the need to satisfy conveniently its social needs, just as no administration can circumvent the important function to fulfil them. Therefore, it is necessary for the local communities to establish a dialogue with the municipal administrations and to agree with them how to meet, at certain times, such needs.

The operational implications of these findings are varied and relate to the problems of dimension, localization, construction and management of services (Clementi, 1983). Precisely because of these considerations, it is necessary to consider the role of the public/private relationship and the role of the project, such as inseparable elements of a single instance to reform the government of transformations. In fact, they cannot be conceived separately, in the abstract rather than the physical form of the city, trusting naively in the capacity of solving by management tools. Neither can they be conceived in the merely evocative power of architectural design which is often drawn in the absence of concrete operational references.

This research, in particular, through a detailed literature review based on legislation, techniques, scientific activities and the analysis of the project outcomes by best practice and the study of multidisciplinary theoretical

models, made possible to detect a range of procedural guidelines and planning requirements, aimed at integrating the planning services with the control of morphological outcomes of urban transformations. Through its development, it has been possible to identify the tools and regulatory procedures to guide the planning of services, as well as the physical characteristics of the settlements that can guarantee the optimization of recovery policies.

9.2 DEFINITION OF MODELS IN SUPPORT OF URBAN PLANNING DECISION-MAKING PROCESSES

The characteristics that make a liveable place and determine attachment to a place, are related to a series of endowments that must be designed in relation to the socio-economic, cultural and territorial context, to new needs, to the actual usability and design quality. While the emphasis of the traditional analyses and arguments insists on a constant survey of quantities, only in recent years a reflection has begun in relation to the quality of the urban standards in use and the actual mode of operation with regards to the context of places.
This research has aimed to make a substantial contribution to this reflection, through the definition of an innovative methodological proposal that can support the localization choices, allowing implementation of the contents of the planning of services. It also reflects the indication of the European Union to revitalize and redevelop urban systems, contained in the 2007 Leipzig Charter[86], which indicates, among the objectives of the planning:

- the definition of consistent and realistic development objectives for the urban area and the identification of a vision for the city;
- the cooperation between public and private sectors in the use of Structural Funds;

[86] The *Leipzig Charter on Sustainable European City*, signed by the Ministers of the territory in May 2007, states that every level of government (i.e.: local, regional, national and European level) has responsibilities towards the future of cities. In order to make effective this model of multilevel governance, it is necessary to improve the coordination of sectoral policies and develop a new sense of responsibility towards an integrated urban development policy. The Charter commits the subscribers to trigger a public debate in their countries on the modes needed to integrate the strategies set in local policies, on the use of integrated tools for the elaboration of urban development projects and on the promotion for the definition of the needed national framework.

- the synergy at the local level, but also at the level of the city-region, and the involvement of citizens and stakeholders who can help to shape the economic, social and environmental future quality of the territories;
- the fight against the building-estate speculation and the land consumption;
- the coordination of local and sectoral plans and policies and the definition of criteria for the use of public and private funds in their spatial allocation.

If welfare policies are dealing with deliverable goods of public services, urban policies have to define the containers within which their delivery takes place, through their quantification, location and distribution on the territory. Through the interaction between policies and innovative tools, the simplification of the quantitative concept of service is put into crisis, and therefore it does not coincide any longer automatically with the urban standards.

The local government, responsible for the public services, should indeed select, within the planned services, those which may be associated with the urban standards, on the basis of local needs and social objectives identified in the area, or those services that a specific community recognizes as basic and essential. The planning, design and quantification of the spaces relate precisely to the determination of the type of services and their organizational forms, as well as the activities necessary to a proper functioning of the urbanized territory. The public body responsible for the proper functioning of the services and facilities, through the planning practice, must therefore ensure not only the equal provision of public goods (services) in the territory within its competence, but also determine, based on the organizational characteristics, those services that can be dimensioned and programmed materially, or those that require a particular location, as well as specific forms of management.

The conceivable operational actions are different and related to several factors. First, it is necessary to determine the relationship that must exist between urban plans and the sectorial plans related to the subject of evaluation and planning of the benefits. Secondly, for the determination of the standards, it is difficult to quantify the functions corresponding to complex needs and integrated services, which must take into account a multiplicity of variables, contexts and relationships. Finally, the distribution of the various functions of planning, programming,

designing and management among the institutional and non-institutional entities must be considered.
This translation of the social needs in operations of urban policy highlights two important nodes of urban planning, concerning the technical-operational and processual dimension to the case, that is: the search for solutions for a constant monitoring of the needs, which must be revised, detailed and localized, and the realization of the listening and interaction with all actors involved in the processes. All these considerations lead to return to the theme of collective satisfaction of public intervention, once quantifiable in terms of space, while now connected to the real role that the public entity can assume within the welfare policies, in terms of measurements of needs and their translation in the choices of planning, programming and managing of the territory. The urban standards, relating to the endowments of services and related facilities, need to be reconsidered as a public performance agreed with local communities. As a consequence, rethinking the local area in a performance logic can be useful and significant. The performance logic shifts the planning focus from how building to why building and then invites to consider the real needs, that is the real demand that determines specific actions for quality construction[87].
The reference to objectivity is essential and, as claimed by Thevénot (2010), it is often accompanied by the invocation of the transparency of information, which the local government has to express in a systematic way. In this passage, it is important to note the convergence that emerges among the different parties in the political arena around the use of the standard as an object of negotiation: a number, a finite amount which assumes a degree of legitimacy (which is highly formal and no longer discussed in terms of technical and scientific rationality), which helps to neutralize the political significance. In order to overcome this characterization, through a pragmatic perspective, it is necessary to discuss the urban standards in terms of "the use that can be made of it", that is the size of the social practices that they define (Bricoccoli and Savoldi, 2011). Equipping the city means being able to respond rapidly and qualitatively to the expressed needs in multiple modes and different

[87] The demand, once expressed, will be defined temporarily and opened to the cultural changes. Moreover it will be basically dynamic ,together with the sources from which derive the reasons that have generated it and to mutability of those reasons. However the answers and the feedback, once implemented, could be put back into crisis.

times, following the practice of constant monitoring and engagement with local realities.

The decision-making process thus becomes, as claimed by Bobbio (1996), "an activity of looking for solutions that can be concluded as much with a decision as a non-decision" (One way of exercising power is in fact also the non-decision, namely the defence of the status quo). Specifically, the decision-making process refers to all the actions that are carried out from the time when a problem arises at the time in which a solution is defined. Since the planning of services is the subject of political and administrative decisions, it follows that the field of research is necessarily interdisciplinary. To understand this dimension, it is necessary therefore to borrow explanatory models from different disciplines, ranging from tools developed by the political and social sciences, the urban geography, to those of the urban planning technique and the applied mathematics. Consequently, the developed methodology through the interdisciplinary integration of models, converts the data to information, by adding extra values to the original data. At the subsequent stage of the process, this derived information should be useful to those involved in the planning process. The particular planning needs determine the nature and features of the required information. Any planning process must focus on a mix of hard and soft information. Soft data/information is often derived from a public discourse between interest groups and individuals, while hard information comes directly from more codified sources. Central to the services planning is the way in which these two types of information are combined and how the right balance can be defined between the amount of hard and soft information used.

In summary, one should always bear in mind that the aim of this research is not to replace planners' judgments and subsequent decisions by politicians but to support them in achieving better decisions. The undeniable help, improvement and added value of any spatial model or technology should not be covered by the easy-made theoretical justification of unknown social consequences. So the methodology becomes a proof of a valuable tool for enhancing the role of information and knowledge in services' planning, which focuses on the demand side, that is community planning.

9.3 ORIENTATIONS AND POSSIBLE DIRECTIONS

The research and the detailed study, carried out during the three years of the PhD course, have led to the definition of an accurate technical and scientific background related to the planning of urban standards, from which it has been possible to formulate a methodology for planning, design and verification of the territorial endowments.
The innovation of the proposed research is that of a new planning of services, through the identification of procedures and implementation of instruments aimed at the performance aspects, and the definition of a method of decision-making support, identifying specific steps to be carried out through appropriate technical and decoding tools for each phase of the urban planning. The methodology has, indeed, seamlessly integrated with planning activities, defining an output for each step, that can support and direct the localization choices.
The procedure has been aimed at:

- evaluating the facilities as elements that increase the vitality of the urban system, through a quality of design dictated by systematic rules, that can accurately represent the reality and influence the quality of life and collective well-being;
- drawing some justified hypotheses in order to define the choice of a system of community facilities, whose final output is derived from the dynamic comparison of the eligible location solutions;
- defining, according to the assessments and assumptions referred to above, a support tool to the choices that cater to urban regeneration.

The local service provision should be considered a local resource and treated in conjunction with the government of each local area. Therefore, the urban project of redevelopment at the neighbourhood scale should, on the one hand, provide for diversified and integrated facilities, designed specifically for each individual territorial reality, and, on the other hand, be opened to the effective involvement of citizens in the planning, design, construction and management of services and facilities. In order to move the theme of facilities and their sizing as standard from the regulatory rigidity to considerations for more space of action, it has been necessary to integrate unconventional and traditional experiences (Tosi, 1994). In fact, the need to address the issue of equipment to the service to the population in a transversal and integrated manner emerges from the discipline. Moreover, even the design tools had to support the different (technical and political) aspects of the

territory and the project itself has become an open and multidimensional practice, regaining its meaning with respect to the community.
The research has established a continuous and cyclical process for the planning of the services, which evolves dynamically, with later improvements through updates after the monitoring of the effects achieved by its operations. In addition, also the nature of the localization has directed the research towards the formulation of locational problems in dynamic terms. The dynamics are inherent to the location problems, above all, because of the manner in which the interventions have been implemented, which, in reality, were necessarily gradual and articulated in time. Most of the existing models are, however, static, i.e. made of a general equilibrium, since they provide for the simultaneous implementation of an entire plan of interventions, without a gradual approach nor delays and without taking into account the interactions of new interventions with the pre-existing reality. Consequently, the present research has developed a technique that allows the dynamic optimization of the localization problems, appropriately evaluating the costs and benefits associated with the various planning phases, and not only at its final result. The planning process for services is pervaded by evaluative moments, even compared to participatory component, in order to understand the criticalities of the system and arising needs in its temporal evolution. It is worth pointing out that in the view of a dynamic and cyclical process, the field monitoring is equivalent to paying attention to the changes and effects that continually act on the relevant classes, and this implies that, if it regards particularly significant effects, the decision will even have to be reformulated or revalued.
The proposed method has been a first attempt, relatively articulate and complex, reflecting all the problems that, unfortunately, can be highlighted after the failure of the traditional urban standards, the systematization of the system of the territorial endowments and the encryption of the needs which lead to the development of a service plan. Through the use of a variety of techniques and the application of different models, it has been possible to define both the strategic orientations of the services at the municipal level rather than their design on a local scale.
The form and content of the defined tool consist of a strategic framework, which demonstrates the development goals, by assigning a specific role to the different services that compose the urban structure, and by identifying actions to be taken between the different sectoral

policies. It is accompanied by the plan of actions, which develops the project contents of the key elements of the outlined strategy, comparing them to the policies of realization practically workable by subjects that implement them according to their constraints and available resources.
The obtained results, only seemingly conclusive, pave the way for further study in terms of the application of the methodology and its implementation in the legislation. The future research should aim more on the operational side, and then the executive aspect, for the optimal location of services.
First, the application of the methodology has been based on the lots in contexts and case studies, which are different from the morphological and the socio-economic point of view. This difference can lead to defining respectively various constraints or a different assessment of the localization cost function. In the first case, for the resolution of the problem, it is necessary to refer to the most powerful electronic solvers, capable of managing a large number of constraints. In the case of the localization function, it would be even more significant to understand how it varies with respect to a different scheme of reality. Moreover, this function could include the elements that characterize the cities permeated by cultural and religious conflicts. According to this possible development, a project of research has already begun. In fact, the methodology will be tested in the case study of the city of Belfast in Northern Ireland, which is a city plagued by issues of social conflict due to the presence of different groups divided by cultural, religious or ethnic issues, and the phase of acquisition of data is recently started. A further development is to define an objective function with an entropic character, in which it is possible to evaluate all services that will be localized simultaneously, defining the Operational Map Project instantly, without carrying out the study by type of service. This could be very significant, especially for the dynamic aspect of planning.
Moreover, further developments regard the regulatory aspects. Starting from the large articulation of examined techniques and models, the next step will be characterized by the simplification of the process, in order to make it operational from the regulatory point of view. In addition, a further next step, compared to the development of the elaborated procedure, especially in view of the involvement of private actors in the realization of the community facilities, could be the elaboration of a system of implementing rules of the Municipal Urban Plan related to

flexibility, understood as variety of provided options, and the legitimacy of the pursuit of convenience.

9.4 CHAPTER SUMMARY

In the last chapter of this thesis, there is an overview of the main issues of research carried out during the three years of the PhD program, which has focused on the important role that facilities and services have in structuring the city and in making liveable the urban tissue. As a consequence, they must be planned according to social, economic and cultural characteristics of the people and their needs, the territorial contexts, the actual usability and the quality of design. The aims of the research have been to define a methodological proposal able to support the decision-making processes and to implement the urban planning tools. However, in order to improve the collective well-being, a series of immaterial actions must be taken, which are related to, above all, the integrated policies and the practice of social participation and inclusion.
Finally, the chapter analyses the limitations of the proposed methodology, as defined in the second part of the thesis, and its future development towards the application in further territorial contexts and the regulatory aspects.

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