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Original

Urban coding in transition. A morphological perspective on contemporary Italian city: the case of Rimini / Crapolicchio, Martina. - ELETTRONICO. - (2022), pp. 1178-1188. (Intervento presentato al convegno URBAN FORM AND THE SUSTAINABLE AND PROSPEROUS CITIES tenutosi a Glasgow nel 29 June - 3 July 2021) [10.17868/80146].

Availability:

This version is available at: 11583/2972356 since: 2022-10-17T10:22:01Z

Publisher:

University of Strathclyde Publishing

Published

DOI:10.17868/80146

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Urban coding in transition.
A morphological perspective on contemporary Italian city: the case of Rimini

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Abstract

The significance of urban codes has recently come to the fore, both for their use in reforming the built environment and their value as new tools for shaping the future. This article explores the disciplinary convergence between urban morphology and urban planning, focusing on the contemporary Italian historical city. The discussion concerns the formulation of new operational guidelines as a derogation to the current urban planning instruments and, based on the transitional morphology study, to trigger mechanisms of urban regeneration in the historic centre of the city of Rimini (Italy). In particular, the cases of two sample areas in which the presence of special buildings (such as the Malatesta Temple by Leon Battista Alberti) and buildings that are extraneous to the surrounding urban fabric are analysed. Questions discussed include: preserving the city's character, a morpho-typological approach to the historic building fabric, and designing detail within the planning process.

Keyword: urban morphology, urban coding, mapping, contemporary Italian city

Transitional morphology and urban planning (intro)

The contemporary urban fabric is essentially the product of rules, policies and standards. Cities show a combination of homogeneity nowadays due to the history of their development and diversity induced by the application of rules. Two specific kinds of order frame the diversity: one is due to urban plans, the other is due to urban codes (**Marshall, 2011**). These factors also affect the structure and composition of ordinary buildings. Urban codes, i.e. the governance tools for decision-makers to generate and regenerate cities, reveal a profound relationship with urban form, which can be studied through the paradigm of transitional morphologies. Transition means studying urban morphologies as a process and not only as a result of it. Transitional urban morphologies are an operational conceptual tool to investigate the urban form of contemporary cities in their historical development up to their present reality and look at their possible future configurations of urban planning and design (**Trisciuglio et al., 2021**). Developing a new generation of urban planning rules requires a deep and critical understanding of the mechanisms of form evolution and the analysis of the effects of regulations on the built environment. Evolution is the lens through which the development of cities can and should be understood (**Marshall, 2008**). The transitional morphologies approach highlights three principles of the Italian school of urban morphology that can be used to modify the urban rule system and to renew the connection between the activities of urban morphological study

(through the mapping of urban realities) and urban planning (through the definition of rule sets). First, existing anthropic structures are the outcome of a process based on each diachronic and diatopic mutation (**Maffei, 2011**). Second, anthropogenic structures establish mutable relationships with each other (**Caniggia, Maffei, 1981**). Thirdly, the structure and character of a city results from both permanences and permutations at various levels (**Caniggia, 1984**). It is possible, restricting the field to the scale on the historical core of the Italian city, to switch these three methodological assumptions to an operational level. The continuous tension between preserving and enhancing historical centres does not grant these urban fabrics to be planned homogeneously, allowing for widespread urban regeneration operations. Already in 1973, **Cervellati and Scannavini**, during their work on the restoration of the historic centre of Bologna, stated that «the aspect of conservation and enhancement must be indissolubly linked to phenomena of an economic and social nature, which constitute the reality within which we operate. In this sense, the historical centre should be considered not only as an inalienable cultural asset but also as a significant economic and constructional asset». As a result of this tension, in the face of the still-open debate, the historic centre is being regenerated at a different speed to the rest of the city. Closing this gap requires careful planning aimed at urban regeneration with compact urban fabric development guidelines without a functionalist approach. This framework gives rise to many questions. **How can the methodological principles of urban morphology be applied to urban planning? What formal characteristics must a building have to be preserved, and which ones to be regenerated? What kind of description can provide a foundation for prescription?**

This article intends to describe the morphological approach to the description of the contemporary Italian historical city to trigger urban regeneration mechanisms through the formulation of new normative guidelines. The result is a form-based urban code that overcomes the tendency to preserve and advocates urban regeneration. This type of approach is being developed in the context of the Detailed Plan for the Municipality of Rimini. In the following sections, there are a clarification of the survey instruments and an in-depth study of two sample areas of the consolidated city of Rimini, which are still being analysed.

Mapping to describe and coding to prescribe (background)

In the field of urban morphology, the relationship between description and prescription is a debated issue. Urban morphology within a geographical and historical tradition focus on the rigorous and systematic description and explanation of the urban landscape (**Oliveira, 2021**). Yet, the architectural and planning practice, which has stratified over the last centuries in the urban environment, has facilitated the introduction of prescriptions. The Italian approach to urban morphology, especially starting from Saverio Muratori's studies, considers the city as a fact that can be described and classified by types (**Muratori, 1960**). The type is intended as a tool for investigating the city's architectural artefacts and their disposition

and combination. Furthermore, urban morphology considers time as a descriptive factor that allows understanding anthropic space as it is in its historical becoming.

On the regulatory and urban planning side, in Italy, the *Testo Unico dell'edilizia* lays down the fundamental and general principles and provisions for regulating building activity. Moreover, different degrees of territorial prescription at different scales and *ad hoc* regulatory instruments, composing a cascade system from the general to the particular. However, some urban planning instruments have programmatic (PSC - Piano Strutturale Comunale), not prescriptive, characteristics and are responsible for choosing the main lines for settlement locations, infrastructures and environmental features. These choices translate into decisive forecasts reflected in the regulations acting at the building scale (RUE - Regolamento Urbanistico Esecutivo). These urban coding tools quantitatively investigate the space of the city. They are based on zoning, describing cities as a patchwork of homogeneous areas with defined regulatory boundaries. As such abstractions are unable to treat differences and singularities, the zoning boundaries neglect a series of grey areas in which the urban plan no longer plans and instead limits itself to regulating the use of the assigned building potentials (Micelli, 2014). In addition, the presence of architectural heritage control and protection authorities is not conducive to regeneration in historical areas (especially those of low architectural value) as they are homologated and classified by function and location as indiscriminately protected areas. The efficiency of urban codes can be improved by considering the results of urban form analysis. The urban morphological studies established by the Italian School between the 1960s and 1980s can become fundamental assets in the formulation and application of codes, especially when those codes have been proven to have a relevant formal background. This approach bases its roots on the cartographic recognition of the processual and dynamic component of the city.

The case of Rimini. State of the art

A case in point is the city of Rimini, located on the northern Adriatic coast of Italy. The Romans founded the historic core of Rimini, and this characteristic is still recognisable in the composition of the *castrum* blocks perpendicular to the *cardus* and *decumanus*. Traces of Roman and Renaissance city walls are also recognisable and stratified, and hidden traces embedded in the urban fabric. Various texts document the evolution of the city's urban fabric, including the first map of the city, the Catasto Gregoriano (1811). The map shows a census of the city's urban and real estate situation, allowing a new and complete type of urban identity to be captured.

Moreover, the map identifies certain typological elements according to a representation methodology similar to Nolli (Gobbi, Sica, 1980). After the Gregorian Cadastre, various maps were drawn up, both programmatic and the city's current state. Today Rimini appears as a city divided by the railway (built in 1882), separating the Adriatic seaside town from the historic city. The caesura of the urban fabric has created over time two towns that have developed at different speeds: the tourist part, which has seen a disproportionate increase in speculative building, and the historic core, which has remained virtually unchanged since the

reconstructions after World War II. The two parts, as well as having different uses and densities, have different matrices and building types. For these reasons, the local municipality is attempting to trigger urban regeneration mechanisms to bridge the gap between the two parts of the city.

Rimini takes on paradigmatic significance like Venice for Muratori, Como for Caniggia and Alnwick for Conzen. In this test field, it is possible to recognise the characteristics of the historical (compact) urban fabric stratified over time and to analyse the regulations in force in the area. This research aims to find regulatory tools suitable for urban regeneration through the study of form.

Rimini as an experimental laboratory (methodology)

The study on the historical urban fabric of Rimini was carried out starting from the collection of cartographic and photographic data in a direct dialogue with the local administration. The collection of original maps and re-elaborations documents the main elements that contribute to defining the character and structure of five emblematic areas (Cavour, Alberti, Tiberio, Mazzini and San Giovanni), chosen as representative archetypes of morpho-typological ensembles (**Figure 1**).

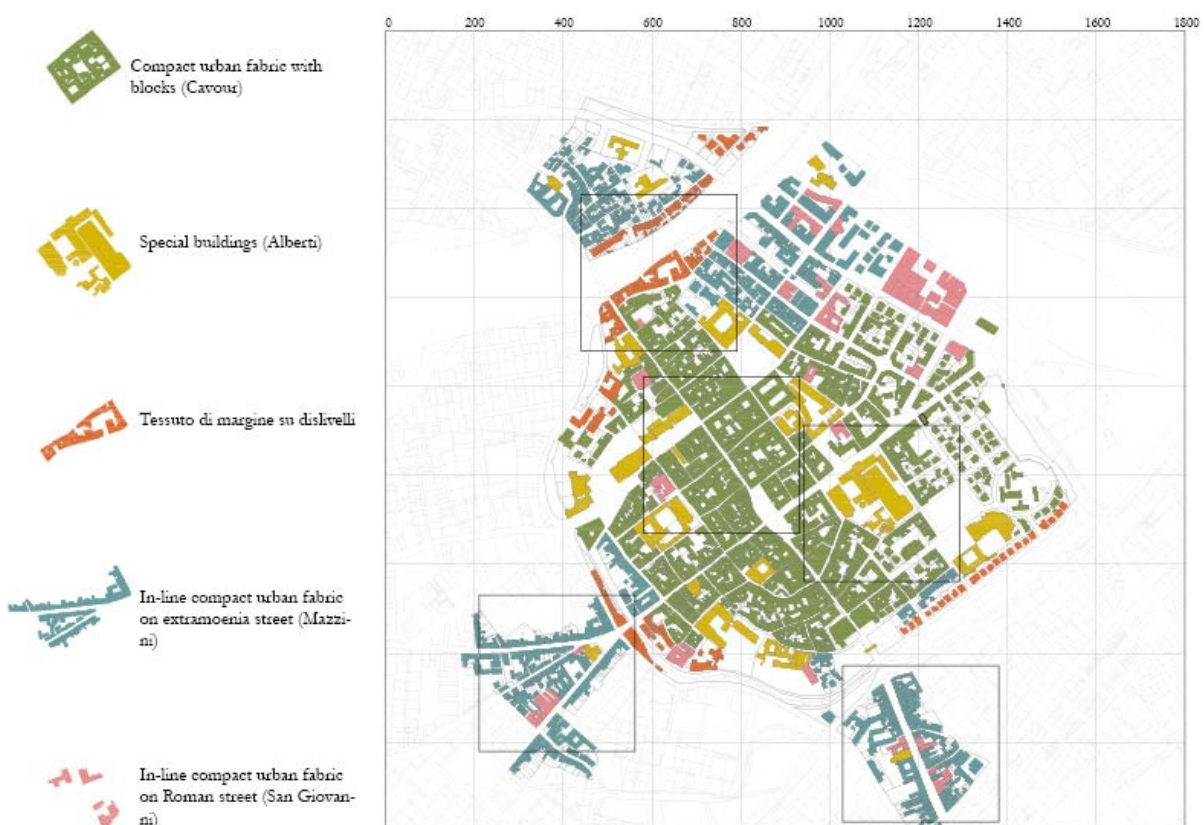


Figure 1. Homogeneous morphology in Rimini historical urban fabric (map drawn by the author)

This operation helps to study the city based on the elements that compose it and define intervention strategies in a localised manner to trigger regeneration mechanisms for the entire urban fabric. This approach makes it possible to collect the evidence of the analysis to formulating generalisable principles. Furthermore, it is possible to elaborate on other issues related to urban morphology in the planning, design and conservation of Rimini's historic centre. The most central areas, coloured green and named Cavour (after one of the main squares), present block aggregation with the formation of more or less occupied inner courtyards. Cavour presents a compact urban fabric with stratifications due to the presence of the Roman morphological system. The marginal areas (Tiberio) of the historic centre are coloured in orange. They are characterised by differences in height due to the presence of the river or the remains of the ancient walls. In the historic centre of Rimini, there is the presence of several areas with compact fabric in line. The highest concentration of this type of shape is present in one of the two extramural but historical conglomerates took into analysis, Borgo Mazzini. The last two homogeneous morphological areas are Alberti, and San Giovanni, explored in this article. The Alberti area contains the Malatesta Temple, a masterpiece of Renaissance architecture by Leon Battista Alberti. The presence of special building conditions, the shape of the built environment and the connecting spaces **(Figure 2)**.



Figure 2. The relationship between the Malatesta Temple and other parts of the block (photograph taken by the author)

Together with Mazzini extramural aggregate on the Roman road, San Giovanni presents building types alien to the surrounding fabric. The difference in height between this extraneous building types and the row houses leads to blind facades (**Figure 3**).



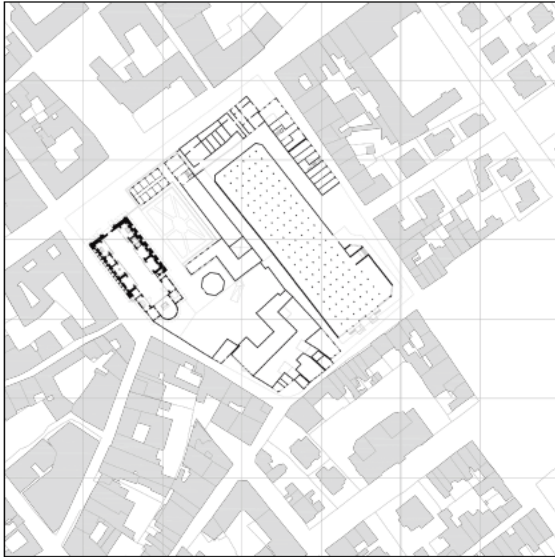
Figure 3. Anti-nodal building in the fabric of the San Giovanni area (photograph taken by the author)

The analysis of the two areas shows in succession the road layout, the typological map in the style of Muratori and the axonometric representation of the volumes. This operation allows to extract the main building types to classify them in an abacus. The aim is to catalogue urban materials morphologically in order to study specific solutions that can then be generalised in a circular process. The aim is to catalogue urban materials morphologically in order to study specific solutions that can then be generalised in a circular process.

Alberti's analysis led to the decomposition of the block with the recognition of the characteristics of the built and open space (**Figure 4**). The Tempio Malatestiano (1503) presence by Leon Battista Alberti intensely conditions the layout of the block. This building is an essential point of reference and constitutes a firm head in observing the entire block. The block and the historical reading composition leads to the identification of different components: buildings of special construction, a ruin, residential buildings in line, a public space or the covered market, a residential block of medieval morphogenesis. In addition to the built typologies, the

Alberti block presents a series of open spaces of public and private use. This succession of spaces is visible in the longitudinal section and the analyses for the recognition of full and empty spaces, the study of the block's internal and external spaces, and the identification of the streets (indistinctly pedestrian and vehicular).

Typological map



Alberti



San Giovanni

Typological abacus Alberti

3D view					
Roof plan					
Ground floor plan					
	Special buildings	Ruin	Building in line	Civil building with naves (market)	Agglomeration of buildings with Medieval morphogenesis

Figure 4. Typological map of Alberti and San Giovanni with the typological abacus of Alberti area

San Giovanni features an important commercial street of Roman origin, the Flaminia. The urban fabric is laid out on the Flaminia in a terraced arrangement showing the main fronts of houses with commercial ground floors on the street. However, some building types outside the fabric stand out, interrupting the continuity of the compact extramural fabric. Such building types, built in the 1960s, are taller and create blind facades and inhomogeneity (**Figure 5**).



Typological abacus San Giovanni



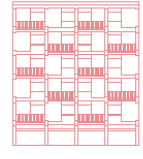




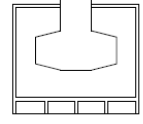




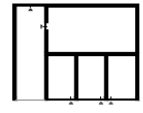


 Elevation	 Elevation	 Elevation	 Elevation	 Elevation
2 floors above ground	3 floors above ground	6 floors above ground	2 floors above ground + garret	3 floors above ground + garret
 Roof plan	 Roof plan	 Roof plan	 Roof plan	 Roof plan
flat roof	flat roof	flat roof	pitched roof	pitched roof
 Ground floor plan	 Ground floor plan	 Ground floor plan	 Ground floor plan	 Ground floor plan
Row building Function: residential, commercial	Row building Function: residential, commercial	Row building Function: residential, commercial	Row building Function: residential, commercial	Row building Function: residential

Figure 4. Elevation on Roman road with typological abacus of buildings

Project simulation (discussion)

The **Alberti study area** is an open block made up of different types of buildings. The variation of the types is accompanied by the variation of the spaces between the buildings that make up a highly variegated urban fabric. The Alberti study area is an open block composed of different types of buildings. The variation of typologies is accompanied by the variation of spaces between the buildings that make up a very varied urban fabric. The specificity of the special buildings does not allow to generalise an implementation reasoning in normative terms. However, the presence of the special buildings means that any type of intervention should not disturb the singularity. For the Alberti case, the use of a design that follows the criteria of parametric design allows guidelines to be drawn for development. By setting a maximum growth volume for the entire block, leaving the Malatesta Temple as a fixed point, each type present can vary in volume. This method creates a balance between the parts and does not distort the structure of the urban fabric.

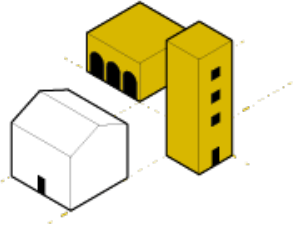

In the **San Giovanni** area, an increase in volume and surface area is foreseen in particular situations. The simulation, therefore, forecasts the addition of volumes and surfaces in different combinations on the blank facades of the tall buildings. The use of air rights in addition to land rights derives from Roman practices, and they are currently allowed in US regulations and widely used. The intent of establishing air rights is to increase

the use of urban space by adding volumes on a neighbour's roof, occupying the air space on the street, transferring the floor area ratio to other buildings, building overhangs, clearing the ground floor and transferring the ground rights on top of the building. The inclusion of such practices in Rimini's building regulations could create a range of different solutions to trigger urban regeneration mechanisms.

Toward a building code based on urban morphology (conclusion)

The prescriptions work as a minimum requirement allowing for variations within the limits of the requirements (Kropf, 1996). The study of urban morphology has provided a basis for defining the requirements of an urban fabric that can trigger regeneration mechanisms. Before concretely defining urban rules that go beyond the current urban plans, the research allowed the drafting of a table. Here, the morphological requirements of the intervention zones (if), the possible actions on the urban fabric with the attached subject who can perform the regeneration actions (you can) and the benefits (advantages) are represented (Table 1). The use of type-morphological analysis, therefore, makes it possible to deduce parts, components and their arrangement, thus establishing what variations and changes are possible. The flexibility of interventions is guaranteed as a number of variations are allowed in fixed systems.

Table 1. Table showing the morphological requirements of the intervention zones (if), the possible actions on the urban fabric with the attached subject who can perform the regeneration actions (you can), the benefits (advantages) and the name of study areas

IF	YOU CAN	ADVANTAGES	STUDY AREA	ICON
There is the condition of: special building fabric and spaces in definition	Reshape plot through: <ul style="list-style-type: none"> - Maintaining plan layout of historical labelled buildings - Recognising existing archetypes - Inter-playing among recognised archetypes looking for a functional balance Promoters: PRIVATE& PUBLIC contract (SUE - regeneration plan)	Adding volumes in percentage	ALBERTI	
There is the condition of: ribbon disposition in the urban fabric along the Flaminia	Recover cubage through: <ul style="list-style-type: none"> - Augmenting surfaces or volumes partially or entirely involving the sides of the buildings according to stakeholders. Promoters: private OWNERS agreement	Adding volumes or/and surfaces in percentage	SAN GIOVANNI	

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