TeMA
Journal of
Land Use, Mobility and Environment

print ISSN 1970-9889 e-ISSN 1970-9870
FedOA press - University of Naples Federico II

DOAJ anvur Rivista scientifica di classe A - 08/F1 Scopus WEB OF SCIENCE

Special Issue 1.2025

Innovation, green infrastructures and urban form

Towards regenerative city models

In the contemporary global context—characterized by increasing environmental pressures, demographic asymmetries, and socio-economic fragmentation and structural inequalities—the relationship between urban form, ecosystem services, and territorial innovation acquires unprecedented strategic value. This Special Issue intends to critically explore and foster a new interdisciplinary debate aimed at rethinking the urban project within a framework of regenerative and systemic transformation.

TeMA is the Journal of Land Use, Mobility and Environment. The Journal publishes papers which adopt unified approach to planning, mobility and environmental sustainability. With the ANVUR resolution of April 2020, TeMA Journal and the articles published from 2016 have been included in the A category of scientific journals. The articles published on TeMA are part of the Core Collection of Web of Science, since 2015, and of Scopus database, since 2023. The journal is in the Sparc Europe Seal of Open Access Journals and the Directory of Open Access Journals.

TeMA Journal of
Land Use, Mobility and Environment

Special Issue 1.2025

Innovation, green infrastructures and urban form.
Towards regenerative city models

Published by
Laboratory of Land Use Mobility and Environment
DICEA - Department of Civil, Architectural and Environmental Engineering
University of Naples "Federico II"

TeMA is realized by CAB - Center for Libraries at “Federico II” University of Naples using Open Journal System

Editor-in-Chief: Rocco Papa
print ISSN 1970-9889 | online ISSN 1970-9870
Licence: Cancelleria del Tribunale di Napoli, n°6 of 29/01/2008

Editorial correspondence
Laboratory of Land Use, Mobility and Environment
DICEA - Department of Civil, Building and Environmental Engineering
University of Naples "Federico II"
Piazzale Tecchio, 80
80125 Naples (Italy)

https://serena.sharepress.it/index.php/tema
e-mail: redazione.tema@unina.it

The cover image: Aerial view of River Bay Singapore, 2017, CC0. Source: https://pixabay.com/photos/singapore-asia-landscape-bay-river-2118682/

TeMA - Journal of Land Use, Mobility and Environment offers researches, applications and contributions with a unified approach to planning and mobility and publishes original inter-disciplinary papers on the interaction of transport, land use and environment. Domains include: engineering, planning, modeling, behavior, economics, geography, regional science, sociology, architecture and design, network science and complex systems.
With ANVUR resolution of April 2020, TeMA Journal and the articles published from 2016 are included in A category of scientific journals. The articles published on TeMA are included in main international scientific database as Scopus (from 2023), Web of Science (from 2015) and the *Directory of Open Access Journals* (DOAJ). TeMA Journal has also received the *Sparc Europe Seal* for Open Access Journals released by *Scholarly Publishing and Academic Resources Coalition* (SPARC Europe). TeMA is published under a Creative Commons Attribution 4.0 License and is blind peer reviewed at least by two referees selected among high-profile scientists. TeMA has been published since 2007 and is indexed in the main bibliographical databases and it is present in the catalogues of hundreds of academic and research libraries worldwide.

TeMA Journal of
Land Use, Mobility and Environment

Special Issue 1.2025

Innovation, green infrastructures and urban form.
Towards regenerative city models

Contents

TeMA Journal of Land Use, Mobility and Environment

TeMA Special Issue 1 (2025) 79-90
print ISSN 1970-9889, e-ISSN 1970-9870
DOI: 10.6093/1970-9870/11139
Received 30th August 2024, Accepted 28th February 2025, Available online 30th June 2025

www.tema.unina.it

Vulnerable Viterbo. Ancient city form and contemporary pressures

Maurizio Francesco Errigo [a]*, Mrak Iva [b]

[a] PDTA Department, Sapienza University of Rome
e-mail: maurizio.errigo@uniroma1.it
ORCID: https://orcid.org/0000-0002-6565-7295

[b] Faculty of Civil Engineering in Rijeka, University of Rijeka (Croatia)
e-mail: iva.mrak@uniri.hr
ORCID: https://orcid.org/0000-0003-2089-7057

Abstract
In Italy the problem of climate change is a question of study that is unfortunately quite recent, more or less since 2015 we have started to understand that this problem exists but it often remains only in administrative theory. The context of the study is emblematic because it is defined by the city of Viterbo in which the system of urban planning rules belongs to a vision, to an idea of the city developed between the 1950s and 1960s and culminated in the approval of the PRG "Smargiassi-Salcini" of 1956 which then merged into the General Variation of 1979, the last unitary instrument of control of the city. Since the 1980s, the city has escaped any holistic vision, avoided the urban planning approach and governance, and pursued its own development outside the master plan rules, favoring the partial variants. The National Recovery and Resilience Programme, presented and hoped for by many as a policy to control territorial imbalances, has not succeeded in this undertaking and has actually contributed to widening the gap between what falls within the domains of the urban planning discipline and what is instead delegated to mere urban or even architectural design.

Keywords
Urban form; Planning; City of Viterbo

How to cite item in APA format
Errigo, M.F., Mrak, I. (2025). Vulnerable Viterbo. Ancient city form and contemporary pressures. *TeMA - Journal of Land Use, Mobility and Environment*, SI1, 79-90. http://dx.doi.org/10.6093/1970-9870/11139

1. Introduction - City form versus climate change

Hail is the result of what the ancients called "a complex dance between air, water and ice in the upper spheres of the atmosphere"; it occurs when the warm air present on the ground rises into the atmosphere carrying humidity and meets the cold air; this creates continuous vortices in which the grain is formed which, with each complete turn of ascent and descent, becomes more voluminous and heavy and when the hailstones reach a mass sufficient to overcome the force of gravity, they begin to fall towards the ground. These phenomena, like those of cloudbursts, are now characteristics of the era of climate change when warm and cold air meet more and more easily and suddenly. Technically, a cloudburst occurs when the quantity of water that hits the ground exceeds 30 millimetres per hour (Legambiente, 2017).

"Water has always played a key role in the dynamics of growth and in the development of a territory; the waters have always been at the center of the history of civilizations; the territories furrowed by the great "water infrastructures" were the first to be urbanized by man and marked the first human settlements (Moraci et al., 2020); water has been at the center of the classical mythology of the gods and has been at the center of religious rituals that have exalted its sacred nature linked to its recognized healing abilities. The water space is a place of intense vitality, a space of relationships, of exchange, a connective tissue, a fluid environment in which flows of people, of goods and of knowledge are realized; the water space, the limit between land and water, is a strategic space, often protected, where a strong landscape and environmental value are recognized; but it is also a strategic space for the transformation of the city" (Errigo, 2018a).

A resilient world places the focus on learning, experimentation and the development of local rules, and embraces changes. One approach to resilience is to encourage new developments and innovations (Colucci, 2012). The resilience in urban planning is crucial for sustainable development, resistance to shocks, creation of adaptive systems important for resilience to fluctuations (Meerow et al., 2016) and allows the cities to resist and recover from hazards and security threats (Godschalk, 2003).

In Italy the problem of climate change is a unfortunately quite recent topic of research, more or less since 2015 (IFAD, 2016) but it still often remains only in administrative theory (Errigo, 2018).

The context of the study is emblematic because it is defined by the city of Viterbo in which the system of urban planning rules belongs to a vision, to an idea of the city developed between the 1950s and 1960s and culminated in the approval of the Comunal Urban Plan "Smargiassi-Salcini" of 1956 which then merged into the General General Urban Planning Variant of 1979, the last unitary instrument of control of the city. (AA.VV, 1993); concepts such as climate change and resilience, intimately interconnected, are revealed to be exempt in the urban planning instrumentation of Viterbo and also in many recent urban projects.

Since the 1980s, the city has eluded any holistic vision, avoids the urban planning approach and governance, and pursues its own development (perhaps it would be better to say growth), outside the rules of the master plan, privileging partial variants. The National Recovery and Resilience Plan, NRRP, in Italian: Piano nazionale di ripresa e resilienza, PNRR, presented and hoped for by many as a policy to calm territorial imbalances, has not succeeded in this endeavor, rather it has contributed to widening the gap between what falls within the domains of urban planning and what is instead delegated to the mere urban or even architectural project. The concept of the future city focuses on the optimization of the relationship between technological advancement and challenges of sustainability at the urban scale (Moraci & Fazia, 2013).

Viterbo is a city that has a surface area with a population that does not reach 70 thousand inhabitants with a surface area of 406 kmq characterized by excellent air quality should be easily considered a safe city from a climatic point of view.

It is true that we inherit a city built and modified when this theme was not known but since 2015 the lighthouse has been turned on and a planning attitude should be synchronous, especially in public works, equal to the multitude of signed acts; in 2016 the city joined the Covenant of Mayors by signing the Action Plan for sustainable energy (Città di Viterbo, 2020), as part of the "Experimental program of interventions for

adaptation to climate change in urban areas", promoted by the Ministry of Ecological Transition, funding of approximately 576 thousand euros was also obtained for the implementation of projects functional to mitigate the effects of climate change and we also remember that the current Mayor of Viterbo was in Milan last 5Th of June where he exposed the fight against climate change and pollution, signing the "Nature-Positive Cities" charter. In short, attention seems to be at its maximum but the projects do not align with expectations.
As the EU study "Soil sealing" shows, peak intensities are related to land consumption, for every 1% increase in land consumption the peak intensity (strength and violence) of precipitation increases by 3%. This means that the more the soil is sealed, the more damage is caused to the city. (Pennino et al., 2024).
Thinking from a contemporary perspective, a city that has invested almost 100 million euros with Regional and PNRR funds in the last two years should have developed projects that contribute to making it safer, what we would call contemporary projects. The aim of this article is to demonstrate how traditional urban planning and recent urban design are on a parallel plane with respect to the indications of the PNRR. The city has distinguished itself for urban acupuncture projects rather than for systemic urban logics.
The aim of the paper is to investigate the planning approach of the City of Viterbo and the recent attitude towards the planning, specially the resilience aspect important in contemporary approach to sustainable development.

2. Urban planning and lack of land management

Viterbo area was known even in Etruscan (Scarponi, 2014) and Roman period (Marino, 2014). The City of Viterbo is a medieval city surrounded and protected by mighty walls (Fig.1); the oldest districts of the city are San Pellegrino and Pianoscarano (Bentivoglio, Valtieri, 1982), medieval districts dating back to the year 1000 whose fabrics still retain the same medieval stratification with buildings constructed in peperino stone on tuff rock without foundations whose walls are built from roughly squared stones with a purely static function (Pinzi, 1993). In fact the city shows some of the typical characteristics of Mediterranean towns such as dense irregular urban texture, stratification of heritage and others (Marović et al., 2022). In 1886 the first city station was built (Viterbo Porta Fiorentina) which served the first railway line Viterbo-Attigliano; in 1894 the second city station was built (Viterbo Porta Romana) which was immediately connected to the Porta Fiorentina station and was intended to connect the city to Rome.
The Pizzini Plan of 1886 mainly questioned the urban form and was mainly aimed at restructuring the centre and the projections towards the outside were constituted by the Bagni road, the opening of Porta Murata which connected the centre with the railway station and the demolition of Porta Fiorentina which connected the city with what in the second half of the 19th century had become Prato Giardino.
In 1912 the Caterina Plan was adopted, which aimed to restore the historic center and improve the road system, providing for expansion in neighborhoods tangent to the city walls, using the Via Cassia as a connecting infrastructure. The Cristofori Plan of 1919 was a project for the enhancement of the thermal waters that he saw as a real opportunity for the economic redemption of the city, the Bullicame was to be welded to the city by means of a 2-kilometer avenue that started from the ancient Porta Bove. The avenue, 50 meters wide and perhaps inspired by the linear city of Soria Y Mata, included a double tram track in the center that two tree-lined strips separated from the roadways; there were also wide tree-lined sidewalks and two strips of building land 75 meters deep intended for villas, hotels and entertainment facilities (AA.VV., 1993).
In 1927 Viterbo became the provincial capital and in the following decade, some public works were completed which transformed the image of the city such as the covering of the Urcionio torrent and the first demolitions of the curtain walls in via Rosselli and in the vicinity of Piazza Francesco Crispi (Gimma, 2001).
The covering of the Urcionio, completed in 1935, allowed the construction of a modern axis crossing the center that started from via Fratelli Rosselli, continued on via Marconi (area of the buried ditch) to join with via Filippo Ascenzi and Piazza del Plebiscito and towards the south with a new road that connected Porta Faul and towards

the west with a new avenue that connected Porta Bove. From Porta Bove started an avenue that connected to the spa (Gimma, 2001). The 1936 Plan envisaged 6 expansion districts outside the walls.
In the 1940s, the city of Viterbo still coincided with the ancient city walls within which, with the covering of the Urcionio, a wide crossing road had been created in a North-East/South-West direction and with extensions around the railway hubs and Prato Giardino.
The first urban planning instrument approved in the city was the Reconstruction Plan of 1946 by the architect Antonio Piraino which was drawn up to rebuild the city after the heavy bombings of the Second World War and which however had as its main characteristic the doubling of the land indices in the historic center and as a consequence the complete transformation of the ancient medieval and Renaissance fabrics with the modification of the building typologies. In some cases, building permits were granted in derogation from the plan, also compromising the road system (for example at the mouth of the Cassia Cimina). The Piraino Plan was inspired by the Mainardi Plan because it concentrated the residential neighborhoods in the Cappuccini – Verità – Pila and Viale Trieste areas and the industrial areas on Via Teverina and Via Cassia.
In 1956, the first real urban planning tool was finally approved, the Master Plan drawn up by Eng. Smargiassi and Arch. Salcini, which was the first real tool, after the Cristofori Plan of 1919, that dealt with urban mobility and infrastructure, proposing the creation of rings that surrounded the entire inhabited center, running nine kilometers around it and surrounding the streets that penetrated the fabric of the historic center.
The system of urban planning rules belongs to a vision, to an idea of the city developed between the 1950s and 1960s and culminated in the approval of the Urban Municipal Plan "Smargiassi-Salcini" of 1956, which later merged into the General Urban Planning Variant of 1979, the last unitary instrument of control of the city.

Fig.1 Ancient map of Tarquinio Ligsutri dated 1596

It is a detailed work, everything comes to life from the old center represented by the designers as a pulsating red heart. One of the weak points of the plan was to have left as white areas some agricultural areas to the west and east that were then progressively built, the white areas did not fall within the requirements of the PRG but those of the building regulation of 1928 which allowed a high index of buildability.

Fig.2 Map of Mainardi Plan (1936)

The General Urban Planning Variant of 1979, the last and still valid urban planning instrument of the city, was built with the same logic as the previous Urban Plan because it continued to highlight the problem of the city from an infrastructural point of view, paying particular attention both to the expansion to the south of the city and to the strengthening of the relief of Viale Raniero Capocci with the creation of the semi-ring ring, still highly strategic for the city.

The Urban Plan considered the intervention on the Orte-Viterbo-Civitavecchia axis and the Nuova Cassia to be strategic for the connection with Rome. The SS 675 was also supposed to relieve the flow of traffic crossing the center.

Attention was paid above all to the flows of residential expansions (Cappuccini, Murialdo, Paradiso, Ellera, Pila, Grotticella and Mazzetta) with the creation of a semi-ring that relieved the flow towards Viale Capocci. The sports center was identified to the north on the Teverina road; several expansion districts were identified and for the university the Urban Plan envisaged not a campus but several locations that would occupy abandoned historical volumes (to encourage integration with the city).

The historic center did not find a precise location in the variant project and its redevelopment was deferred to the detailed plans.

The expansion in the 80s involved the neighborhoods of Santa Barbara, Ellera and Carmine and Pilastro for subsidized and agreed public housing and the areas of Murialdo, Barco, Pila, Grotticella, Pietrare and Ellera for private housing.

For services, the Plan identified the neighborhoods of Riello, Palazzina, Teverina, Belluno while for management activities the neighborhoods of via Garbini, Riello and Pietrare. The industrial areas and zones were located to the north, at Poggino and on the Teverina.
The region of Viterbo has experienced significant urbanization since the 1960s even in places with population drops (Romano and Zullo, 2014), which makes it even more challenging to have the most recent plan created before 1980s.

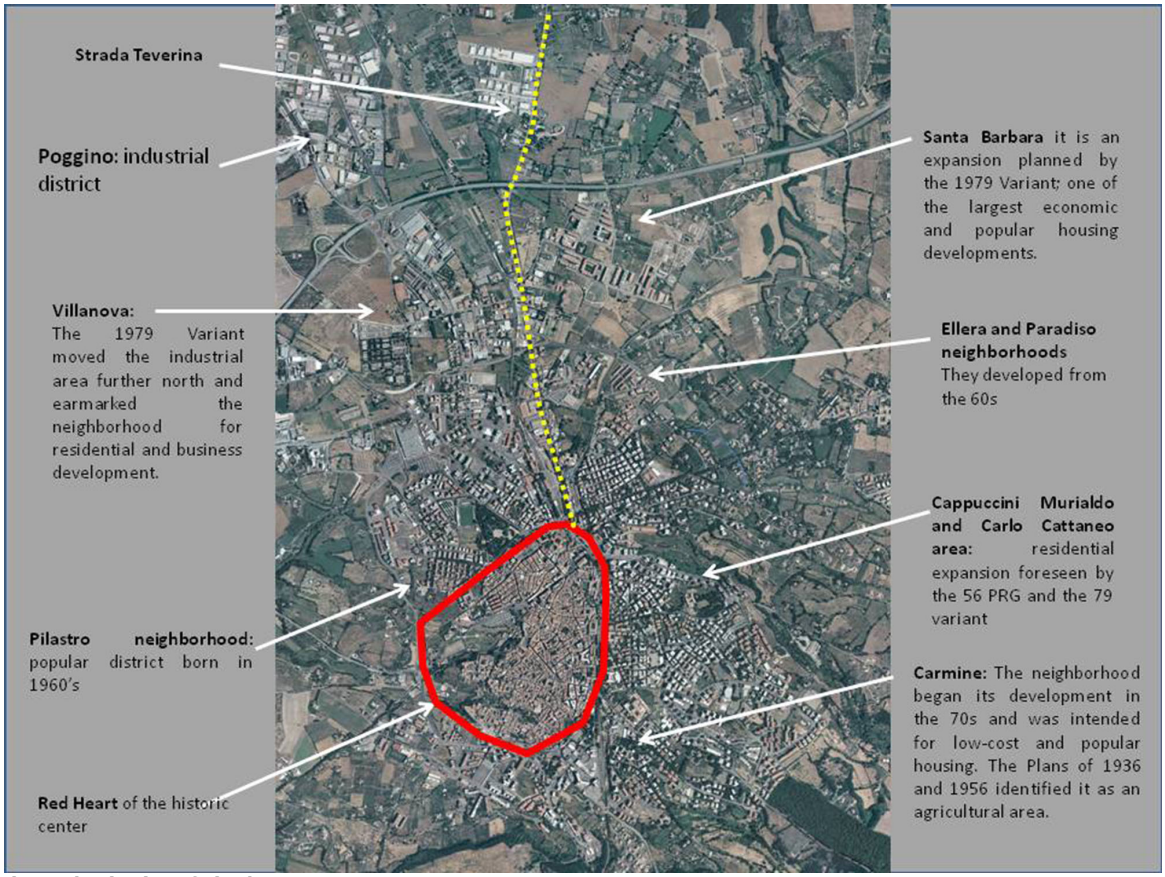

Fig.3 Urbanisation of Viterbo

3. Innovations, projects, urban debate

In recent years, especially in the last two years, the city (Fig.3) has formally become aware of the lack of urban planning or at least the need for its updating; the urban planning tool still in force is the General Variation of 1979 supported, for the historic center, by a 2014 Ornamentation Regulation which however lacks the part relating to the prescriptions on colors. In recent period, the city has been dealing with the drafting of three fairly important urban planning tools: the Recovery Plan for the historic center which will start in 2025; the Architectural Barrier Elimination Plan which is in the start-up phase with the detection of critical issues through questionnaires, and the Sustainable Urban Mobility Plan (Moraci et al., 2018), also in the start-up phase and the detection of problems through questionnaires. The "Regulation on the monetization of urban planning standards and related parking" was also approved in 2024 (Comune di Viterbo, 2023) with which it is possible, when building or renovating a building by increasing its volume or changing its intended use, to no longer cede the surfaces for the creation of service areas, but on the contrary to pay the municipality an alternative amount to the direct cession of the same areas without creating standards (Karrer et al., 2020) or relevant parking lots. Monetization is defined by some regional urban planning laws as a residual option to be applied only where it is not possible to achieve the mandatory urban planning standards; in many rulings of the Council

of State it is established that the areas created with the monetization of the standards must be functional to the urban planning load induced by the new building interventions.

Fig.4 The ancient city surrounded by green surface and new districts

Article 3 of the regulation allows monetization for "building interventions to be implemented in the homogeneous territorial zones of Type A and B, pursuant to Ministerial Decree 1444/68 and subsequent amendments, as well as in those of Type C implemented and subject to the issuing of the direct or agreed building permit pursuant to art. 28 bis of Presidential Decree no. 380/01 and subsequent amendments."; it is clear that this is a regulation that can directly affect the urban form and the conformation of the building sectors given that the C zone, according to the Viterbo Master Plan, "includes the parts of the territory intended for new settlement complexes that are still unbuilt or in which the pre-existing construction does not reach the surface area and density limits established for the B zone"; in Viterbo the C zone has 18 sub-zones, therefore 18 different types of areas of the non-historical city. The monetization of the standards in areas like C zones in a city favors the creation of an expansion without services (for example wtihout the parking lots) while in the suburbs the parking quota should almost help the mobility of the historic center and in any case raise the urban standard considering that Viterbo is one of the cities with the highest national rate of motorization (74 cars for every 100 inhabitants)[1] (Legambiente, 2020).

[1] In Italy there are have 62 cars per 100 inhabitants; Italians are considered the "major car consumers" in Europe; travel by car represents around 80% of urban mobility in Italy: more than double the European average. In Stockholm, the use of the car as a means of private transport represents only 25% of urban mobility. In London, 85% of commuters travel on public transport, in Milan only 45%. 50% of trips that occur in urban areas are less than 5 km, 30% are less than 3 km; the distances that can mostly be easily covered by bicycle or, in some cases, on foot. According to a survey by the Italian Automobile Club, out of 105 Italian provincial capitals, the city of Viterbo is characterized by one of the highest Italian motorization rates with 77 cars per 100 inhabitants, on par with cities such as L'Aquila and Potenza and only surpassed by Catania and Vibo Valentia (78 cars per 100 inhabitants), Isernia (79 cars/100 inhabitants) and Frosinone which holds the national record with 80 cars per 100 inhabitants. Virtuous cities in this context appear to be some metropolitan cities such as Bologna (53 cars/100 inhabitants), Florence (56 cars/100 inhabitants), Genoa (48 cars/100 inhabitants) and Milan which has as many as 49 cars per 100 inhabitants as evidence of the important strategies on public urban mobility carried out in recent decades. Looking at the cities with which Viterbo is related by system hierarchy or by similarity in size, we can see that Terni and Siena have 67 cars per 100 inhabitants, Perugia 75 per 100 and Rieti 74 per 100, all lower numbers, some not by much , to the reality of Viterbo.

The Regulation on the monetization of standards and appurtenant parking is certainly a useful tool, it probably should have been approved after the drafting of the recovery plan for the historic center and should probably have been almost "armoured" within the historic areas (A and B of the Plan). The expansion areas should certainly have been excluded except, perhaps, for small interventions on existing buildings with a small variation in the urban planning load. The Regulation is inextricably linked to the idea of the city; Viterbo cannot afford to increase the urban planning load to the detriment of services such as parking and greenery. The urban form in the era of climate change could suffer heavy repercussions considering that the building filter zones, the resilient buffer zones, are the free surfaces not waterproofed by the urban planning standards. Another consideration must be made on the transformations underway with the projects approved with resources from the National Recovery and Resilience Plan; the Municipality of Viterbo in the last two years has shown a certain vitality in participating in calls for tenders and in the use of PNRR resources; consulting the website openpnrr.it it appears that in Viterbo there are 45 active projects that can be implemented with PNRR resources, ranging from the renovation of public buildings, to the redevelopment of infrastructural itineraries, to the strengthening of alternative mobility tools to the car (Pellicelli et al., 2022).
The interventions, some of which have already been announced, will affect different parts of the city in every sector: construction, sports, environment, greenery, sustainable mobility, historic center.
As for public works, the expected amount amounts to half of the overall package, over 13 million are instead destined for school buildings, more than 12 for the medieval heart of Viterbo, 7 for sports facilities, 3 for greenery and over 15 for sustainable mobility. The main interventions are divided into three main areas, which are urban regeneration, securing the territory and strengthening urban mobility; important interventions, for a value of approximately eleven million euros, are also aimed at the recovery of school buildings, which, especially those in the historic center, are characterized by structures built in the 50s. Among the more widespread interventions that affect a large surface area we can mention the creation of an ecological walk along the civic walls (resources mobilized 3 million and 100 thousand euros), which however, in many sections, reveals points of conflict both with mobility, with the cultural heritage and above all with the ecology of the project that includes a belt of impermeable sidewalk along the civic walls even if interspersed with the planting of 88 new trees and some permeable surfaces of some "pocket parks" such as for example in the part facing the Chamber of Commerce. None of these projects is particularly attentive to the introduction of concepts such as urban resilience, the fight against pollution, the fight against the increase in heat islands or the reduction of surface run-off.

4. Conclusions

The contemporary design of public space is a complex topic to deal with, especially where the space is monumental, stratified, strongly identifiable and full of history. (Ricci et al., 2023).
For a good architect, the past is a palimpsest. It is not a discussion of beauty, aesthetics, or what is liked; a project is always the synthesis of a complexity of infinite factors that a good architect must weigh and select and try to offer a shared technical solution that combines history, protection and contemporary needs; this is the real challenge of the project, and here only the best succeed. We can refer to history as long as we have documentary evidence, testimonies such as photos or drawings that may have handed down information to us. However, we cannot know whether before that evidence there may not have been a different conformation of the public space, or of the facade of a building. It is a fragile and risky terrain on which we must proceed with caution. Today in public space projects, protection is the first objective to pursue, especially in precious cities like Viterbo, but a second element, no less important, is the well-being of public space, that is, making that space usable and enjoyed by the population and here we cannot design as we did a hundred years ago because our cities have changed (Fig.3), mainly by virtue of two factors: awareness of fragility and disabilities

and climate change. By virtue of these two factors, a contemporary architect designs a public space with a different awareness, making it accessible and making it less of a heat island (Isola et al., 2024).
The PNRR is making available to cities (including Viterbo) an unprecedented amount of economic resources that could be used largely for actions and projects that allow us to innovate the shape of our cities by acting on the resolution of the most critical problems that are normally safety from environmental risks and urban accessibility. We could also work on a renewal and updating of the urban control tools of the territory, producing clear and innovative studies and prescriptions perhaps inspired by successful national projects and strategies such as the Resilience Strategy of Milan, the projects Resilient Padua, Resilient Mantua, the Climate Change Adaptation Strategy of Reggio Emilia, the Waterproof cities of Rotterdam and Barcelona, the Rotterdam Climate Adaptation Strategy (City of Rotterdam, 2010), the Room for the River programme in the Netherlands, the Water Sensitive Zomerhof, the Watersquares and the Green Roofs programme in Rotterdam, the public space projects in Ghent, Belgium (Ghettingplein), the Yongsan National Urban Park Master Plan in Seoul, the Highline in New York or the projects by De Urbanisten and MVRDV in Rotterdam.
Interventions that, if combined with other projects fundable with other regional and ministerial calls, could really change and transform the urban face of the city of Viterbo, assuming that the city has never managed a wealth of resources like this.

Fig.5 The cloudburst of August 29th, 2024

However, what emerges loudly and clearly even to non-experts is that the interventions planned and designed in recent years are not part of a system logic, a strategy and an urban vision that corresponds to a clear idea of the city. They are all interventions related to the scale of the urban project, in many cases even of the architectural and building project, which are separated from rules and tools for planning and governing the city such as those appropriate to an urban plan and a multi-year program and, as told in the previous chapter, the projects are not particularly attentive to the introduction of concepts such as urban resilience, the fight against pollution, the fight against the increase in heat islands or the reduction of surface run-off and there is low attention also to establish a set of rules able to innovate urban planning framework.
Viterbo has a profound technical contradiction; on the one hand, it is designed with modern and contemporary resources using the scale of the building project and in very few cases urban; on the other hand it still designed

and planed with an old frame of reference, the last plan of 1956, the general variant of 1979 and with a myriad of partial variants approved in recent decades that have distorted any idea of the city that has been elaborated and has emerged from the technical salons developed between the 60s and 70s.

This is even more interesting because during the years, there had been different initiatives to update the planning framework and increased attention to contemporary topics.

In 2013 the City of Viterbo announced the willingness to create the strategic plan based on the, at that moment, cutting-edge premisses of resilience, introducing the concepts of regenerative city, integration of cultural and natural capital, community engagement and trust, sustainable development goals, Historic urban Landscape, circular economy and creation of strategies (Girard et al., 2014). In the similar vein, (Romano and Zullo, 2014) indicate the general issues with the growth in central Italy, shared by City of Viterbo such as: transport diseconomies, energy waste, reduced agricultural land, ecological challenges and the need for considering more population needs and sustainable development, particularly reconversion of abandoned urban areas, creation of observatories and structured communication.

Other research on resilience highlights the aspects such as accessibility (Errigo, 2022), or propose the requalification of historic centre based on the morphology and sustainability (Maretto et al., 2020).Urban planning as a science and above all a technique of governing the city and the territory has been absent in Viterbo for some decades, we can perhaps represent the last phase of the urban planning debate with the image of the red heart, representing the historic center in the distant Mainardi Plan of 1956. An ancient urban form that on the one hand should be preserved as an immense cultural heritage but on the other, at least in the spaces outside the walls, should be reviewed and redesigned with a contemporary perspective to make the city less fragile and safer and more resilient. Seeing today urban and building projects protected by a weak or absent relationship with urban planning rules, because these planning rules are too dated today, turns out to be a big problem to pay attention to and intervene on; the city of Viterbo needs to exit the phase of interpretation and regulatory updating and equip itself with modern and innovative tools that can define rules and times for a new urban season, characterized by protection, climate adaptation and the enhancement of the identity of the city. The new phase that is starting, with the drafting of three important urban planning tools including the recovery plan of the historic center, could be the ideal time to implement the innovation of the government of the municipal territory.

Attributions

Paragraphs 1 and 3 were written by M. F. Errigo; paragraph 2 and 4 was written by M.F. Errigo and I. Mrak.

References

AA.VV. (1993). *Viterbo – Politica, economia, cultura e sport 1945-1992*, DEUI Editore

Bentivoglio, E., Valtieri, S. (1982). *Guida a Viterbo*, Edizioni Dedalo

Ceci, M., Caselli, B. & Zazzi, M. (2023). Soil de-sealing for cities' adaptation to climate change. *TeMA - Journal of Land Use, Mobility and Environment*, *16* (1), 121-145. https://doi.org/10.6093/1970-9870/9395

City of Rotterdam (2010). *Rotterdam Climate Proof Programme*. Retrieved form http://deltacityofthefuture.com/cities/rotterdam/main-publications

Città di Viterbo (2020). *Piano d'azione per l'energia sostenibile*, SINPRO Ambiente. Retrieved from: https://mycovenant.eumayors.eu/docs/seap/21186_1469778265.pdf

Colucci, A. (2012). Towards resilient cities. Comparing approach/strategies. *TeMA - Journal of Land Use, Mobility and Environment, 5* (2), 101-116. https://doi.org/10.6092/1970-9870/921

Comune di Viterbo, *Regolamento sulla monetizzazione degli standard urbanistici e dei parcheggi pertinenziali*, 2023

De Noia, I., Caselli, B., Kemperman, A., Rossetti, S. & van der Waerden, P. (2024). Towards participatory urban planning: insights from citizens. Results of a public questionnaire on climate change and its local effects in Parma. *TeMA - Journal of Land Use, Mobility and Environment*, *17* (2), 193-212. https://doi.org/10.6093/1970-9870/10836

Errigo M.F., Waterscapes. Progetti d'acqua. Città termali fluviai e costiere in Italia e in Olanda, Ed. Le Penseur, 2018.

Errigo, M. F. Urban Pressure: Facing Climate Change and Social Vulnerability. Preprints 202208.0047.v1 (2022) https://doi.org/10.20944/preprints202208.0047.v1

Fusi, M. & Tiboni, M. (2024). Urban and transport planning integration. A case study in a mid-size city in Italy. *TeMA - Journal of Land Use, Mobility and Environment*, (3), 23-41. https://doi.org/10.6093/1970-9870/10914

Gimma, M.G. (2001). *Il centro storico di Viterbo*, Betagamma editrice, ISBN 88-86210-45-0

Girard, L. F., De Rosa, F. & Nocca, F. (2014). Verso il piano strategico di una citta' storica: Viterbo. *BDC. Bollettino Del Centro Calza Bini, 14* (1), 11–37. https://doi.org/10.6092/2284-4732/26633

Godschalk, D. R. (2003). Urban Hazard Mitigation: Creating Resilient Cities. *Natural Hazards Review, 4* (3), 136–143. https://doi.org/10.1061/(ASCE)1527-6988(2003)4:3(136)

Guida, C. (2022). Climate adaptation in the Mediterranean: Where are we?. *TeMA - Journal of Land Use, Mobility and Environment*, *15* (1), 141-148. https://doi.org/10.6093/1970-9870/9037

IFAD, La storia non raccontata: il cambiamento climatico non fa notizia. Festival internazionale del giornalismo di Perugia, nell'aprile 2016.

Isola, F., Lai, S., Leone, F. & Zoppi, C. (2024). Integrating climate change adaptation into municipal masterplans through

Strategic Environmental Assessment. A case study concerning Sardinia. *TeMA - Journal of Land Use, Mobility and Environment*, (1), 61-78. http://dx.doi.org/10.6093/1970- 9870/10438

Legambiente (2017). Le città italiane alla sfida del clima. Gli impatti dei cambiamenti climatici e le politiche di adattamento

Maretto, M., Gherri, B., Chiovitti, A., Pitanti, G., Scattino, F. & Boggio, N. (2020). Morphology and sustainability in the project of public spaces. The case of the historic centre of Viterbo (Italy). 5, 23-44. https://doi.org/10.32891/JPS.V5I2.1280

Marino, P. (2014). Viterbo, ipotesi di identificazione dell'anfiteatro romano. http://www.fastionline.org/mod_code/download.php?file=FOLDER-it-2013-297.pdf

Marović, I., Mrak, I., Ambruš, D. & Krstičević, J. Building Interventions in Mediterranean Towns—Developing a Framework for Selecting the Optimal Spatial Organization and Construction Technology from a Sustainable Development Perspective. *Buildings 12*, 1233 (2022).

Meerow, S., Newell, J. P. & Stults, M. (2016). Defining urban resilience: A review. Landscape and Urban Planning, 147, 38–49. https://doi.org/10.1016/J.LANDURBPLAN.2015.11.011

Moraci, F., Fazia, C. (2013). The Smart Cities and the Challenges of Sustainability. *TeMA - Journal of Land Use, Mobility and Environment, 6* (1), 35-45. https://doi.org/10.6092/1970-9870/1459

Papa, R. (2024). NEW CHALLENGES FOR XXI CENTURY CITIES Global warming, ageing of population, reduction of energy consumption, immigration flows, optimization of land use, technological innovation 1. *TeMA - Journal of Land Use, Mobility and Environment*, *17* (1), 3-6. https://doi.org/10.6093/1970-9870/10880

Palermo, A., Chieffallo, L. & Virgilio, S. (2024). Re-generate resilience to deal with climate change. *TeMA - Journal of Land Use, Mobility and Environment*, (1), 11-28. https://doi.org/10.6093/1970-9870/9969

Pellicelli, G., Rossetti, S., Caselli, B. & Zazzi, M. (2022). Urban regeneration to enhance sustainable mobility, *TeMA - Journal of Land Use, Mobility and Environment*, 57-70. https://doi.org/10.6093/1970-9870/8646

Pennino, S. (2024). Global warming or global warning? A review of urban practices for climate change adaptation in Europe. *TeMA - Journal of Land Use, Mobility and Environment, 17* (1), 169-177. http://dx.doi.org/10.6093/1970-9870/10784

Pinzi, C. (1993). *I principali monumenti di Viterbo*, Sette Città edizioni, 1993, ISBN 88-86091-01-X

Romano, B. & Zullo, F. (2014). Land urbanization in Central Italy: 50 years of evolution. *Journal of Land Use Science, 9* (2), 143–164. https://doi.org/10.1080/1747423X.2012.754963

Scarponi, A. S. (2014). Prima interpretazione di rinvenimenti di epoca etrusca e tardo-ellenistica in territorio vulcente Farnese (Viterbo), loc. Chiusa del Belli. http://eprints.bice.rm.cnr.it/10348/1/FOLDER-it-2014-323.pdf

Sgambati, S. (2023). The interventions of the Recovery and Resilience Plan in Italy: cities adaptation to climate change. *TeMA - Journal of Land Use, Mobility and Environment*, *16* (3), 645-651. https://doi.org/10.6093/1970-9870/10313

Image Sources

Fig.1 Ancient map of Tarquinio Ligustri dated 1596, Bibl. Ap. Vat. Geogr. I, 318

Fig.2 Map of Mainardi Plan (1936) Retrieved from AA.VV. (1993). *Viterbo – Politica, economia, cultura e sport 1945-1992*, DEUI Editore

Fig.3 Urbanisation of Viterbo, image processed by the Author

Fig.4 The ancient city surrounded by green surface and new districts, image processed by the Author

Fig.5 The Cloudburst of August 29th, 2024. Retrieved from https://etrurianews.it/2024/08/27/viterbo-pioggia-vento-e-grandine-allagano-la-citta-e-fanno-oscillare-la-macchina-di-santa-rosa-video/

Author's profile

Maurizio Francesco Errigo

He is Associate Professor in Urban Planning at the Department of Planning, Design, Architectural Technology of the La Sapienza University of Rome. He teaches Urban Planning II in the Degree Course in Architecture. He taught Socio-Spatial Processes in the City and Analysis and Design of Urban Form at the MsC in Urbanism AR1U100 R&D of the Delft University of Technology (TUDelft), Visiting Professor at the Escola Tècnica Superior d'Arquitectura del Vallès (ETSAV), Universitat Politècnica de Catalunya and at the Faculty of Engineering of the University of Rijeka in Croatia. He is currently involved as Scientific Manager for the PDTA Department of Sapienza in some projects of cultural accessibility, and tourism enhancement.

Iva Mrak

She is Associate Professor in Architecture and Urban Planning at the Faculty of Civil Engineering in Rijeka, University of Rijeka, Croatia. She teaches a variety of courses, from technological to planning, including spatial planning, building for tourism, industrial heritage, building design and universal design. She is currently researching on the topics of climate adaptation and morphology.