

ICTPW



22nd-23rd April 2024

**International Conference
of Tirana Planning Week**

by POLIS University

BOOK OF PROCEEDINGS

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ISBN (e): 978-9928-347-14-5

DOI: 10.37199/c41000700

Tirana planning Week

TPW24 will be an International scholarly event dedicated to the urgent theme of “Urban Sustainability and Resilience in the context of the 21st century challenges”. We extend a warm invitation for you to contribute to this intellectual discourse by proposing to organize an event within the **TPW24**.

TPW24 is a distinguished event hosted by the Faculty of Planning, Environment and Urban Management (FPMMU) at POLIS University in Tirana and it is set to be a dynamic amalgamation of thought-stimulating activities, including conferences, keynote speeches, round tables, workshops, and exhibitions.

Tirana Planning Week event is organized by POLIS University (Albania), Department of Architecture of Ferrara University (Italy) and the University of Thessaly (Greece). Our university partners are UNECE, UNDP Albania, AUA, IHS- Rotterdam, while memberships extend to AESOP, ISO-CARP and ENHR.

The central research theme of Tirana Planning Week 2024 is urban sustainability and resilience. This interdisciplinary theme surpasses the confines of planning and urban management, intersecting with a multitude of other disciplines. Consequently, we extend our invitation to experts, researchers, and academics from diverse fields whose research intersects with urban space, to enrich this event with their invaluable insights.

Urban Sustainability and Resilience in the context of the 21st century challenges

Conference Theme and Rationale

The International Conference of Tirana Planning Week 2024 (ICTPW24) is centered around the pivotal theme of urban sustainability and resilience. This multifaceted theme invites exploration across a spectrum of dimensions, encompassing formal, functional, social, economic, and environmental aspects. Recognizing the interdisciplinary nature of this theme, we warmly invite participation from experts, researchers, and academics across diverse disciplines whose work intersects with urban sustainability and resilience. This conference presents a unique opportunity to engage in a rich, multidimensional dialogue on the pressing challenges and innovative solutions in the realm of urban sustainability and resilience. We invite you to submit your abstracts that contribute to our theme. The topics of interest include, but are not limited to:

- **Formal Sustainability**

This subtheme explores the physical and spatial aspects of urban sustainability. It delves into the design, planning, and architectural practices that contribute to the creation of sustainable and resilient urban forms.

- **Resilience and Economic Sustainability**

This subtheme focuses on the economic factors and functional programs that drive urban sustainability. It examines the role of economic policies, market mechanisms, and functional programs in promoting sustainable urban development.

- **Social Sustainability**

This subtheme addresses the social dimensions of urban sustainability. It investigates how social equity, inclusivity, and community engagement can be fostered in urban settings to ensure a sustainable and resilient future.

- **Environmental Sustainability and Green Transition**

This subtheme centers on the environmental aspects of urban sustainability and the transition towards greener urban environments. It looks at strategies for mitigating environmental impacts, promoting biodiversity, and transitioning to low-carbon and resource-efficient urban systems.

- **Sustainability of Urban Policy and Governance**

This subtheme discusses the role of policy and governance in urban sustainability. It considers how effective policy-making, governance structures, and institutional practices can support the implementation of sustainability and resilience strategies in urban areas.

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01 - Formal Sustainability

This subtheme explores the physical and spatial aspects of urban sustainability. It delves into the design, planning, and architectural practices that contribute to the creation of sustainable and resilient urban forms.

Playful Design Strategies. The Introbots Experience: Enhancing Co-Design Practices for Inclusive and Engaging Urban Spaces with Children.

Valerio Perna

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DOI: 10.37199/c41000701

Abstract

Western Culture has stigmatized introversion as a less desirable trait of personality especially for designers and people involved in creative activities. According to many studies, an extroverted character is considered a plus and leads to a more successful and satisfying life. But is true that introverts are at a disadvantage?

The Introbots are a group of fluffy and goofy playful artefacts that aim to create an exploration and a commentary of what it means to be introverted and to pave the way for educators and students to reflect on the misconception that extroversion is positive and introversion is a disadvantage to be corrected.

In 2018, they were the protagonists of a workshop at the School of Architecture (SOU) in Favara children, when they were used to sensitize the young students to the topic of introversion and to empower them to design more inclusive playground and urban spaces in the urban environments. The chapter discusses the results of that experience and implicitly shows how the relationship between play and learning is not unilateral but rather biunivocal, and the playful artefacts are not just mere instruments but real tools that can help us to disclose the power of play when it comes to the design of our urban landscapes.

Keywords: *Playfulness, research through design, introversion, intelligent artefacts, architecture and children.*

Introduction

Play as a Pedagogy and Social Tool. *“At the moment of the appearance of language, the child no longer finds himself dealing only with the physical universe, as happened before, but with two new worlds, which are moreover closely connected: the social world and that of internal representations.” (Piaget [1967] 2000, p.29).*

Talking about gaming as a system of teaching and transmitting knowledge almost seems like an oxymoron. For a large part of pedagogy - and those involved in education in general - play seems to be a minefield with unexpected implications, which always coincides with the abandonment of serious things and contrasts with study, work and seriousness.

It is generally classified as something that belongs to the sphere of pleasure and desire (dynamics which however stand at the core of many manifestations of playful activity) and contrasted with commitment and seriousness. There is nothing more wrong than this. As many studies have confirmed through the decades, “gaming is serious business. Indeed, serious!” .

It is only starting from Romanticism that playful activity is re-evaluated thanks to a series of pedagogists - first of all Froebel (1887), - who begin to talk about play as an activity that educates. In their vision, the child grows by playing and learns to deal with the outside world, to accept the

unpredictability of events and to enter into a relationship with what is different from what is. This is certainly a decisive step towards a re-evaluation of play in educational systems but still dangerous because it assimilates it to a tool ready to be used in case of need and not to a tool capable of developing the creative and speculative component that we so much like interest.

For this reason, it is interesting to delve deeper into the connection between play and learning, understanding the latter as a persistent modification of a set of behaviours that involve multiple cognitive functions, including thinking, memory, and attention (Anolli, Mantovani 2011). Play is an original and significant experience of human action (Antonacci in Bertolo, Mariani 2014) and at the same time has a symbolic, polysemic, ambivalent value and generates contradictory and transformative knowledge. In recent years, an increasingly broader branch of Game Studies - and Game Design - has focused on interactive playful artefacts capable of facilitating learning, the so-called Pervasive Games . This type of games stimulates dynamics of communication and contextual knowledge and activates the physical space in which they are played. It is also interesting how their potential continues to grow as technological developments allow for an ever-increasing digital dimension of these playful artefacts and produce a real change in how we see, understand and build the world. This is a phenomenon found especially in very young people, those who are called digital natives (Prensky 2007). The latter, thanks to the potential of the digital age, have decisively changed their attitude towards the acquisition of new knowledge. In particular, they have developed a type of learning that uses metaphors and metalanguages (Salen, Zimmerman, 2004; Jenkins 2009). Nonetheless, they have developed a critical inclination to choosing types of games that aim at transmitting and sharing a certain type of content over others (Jenkins 2009), demonstrating precisely how the relationship between play and learning is not unilateral but rather biunivocal, and the playful artefacts are not tools but real instruments of thought. The learning experience that the act of play provides us (Antonacci in Bertolo, Mariani 2014) is experiential and is based on the practice of observing, imagining, and transforming the products of these perceptive actions into creative material through simplification operations, abstraction, and decontextualization of reality. Indeed, the learning phase is not only the frontal one of passive transmission of notions but the active one in which the student/student concretely tries his hand at doing. Generating significant ludic experiences means involving players on multiple levels, transmitting relevant content to them, and inviting them to reflect critically on what is experienced through the activity of playing, activating processes capable of generating intersections between ludic and ordinary through a powerful medium such as the game. The theoretical components discussed so far will now be presented in the form of a research project where the dynamics and play mechanics have been catalyzed within an intelligent device capable of activating a learning-by-playing phase to address and demystify the concept of introversion from an individual problem to a simple personality trait (Jung, 1921) in lesser or greater presence in each of us.

Fluffy Intelligent Robots. Some details on the bots

Introbots are some small and portable robotic entities endowed with an Arduino microcontroller at their core, alongside motorized mechanisms facilitating locomotion and navigation. Complementing their functionality, these creations integrate dual light sensors for environmental awareness and a collection of light-emitting diodes (LEDs) for visual expression. Furthermore, they are designed to be cute, relatable, and a bit goofy, covered in fluffy fur and with big, bulging eyes.

¹The quote comes from the work of the Jean Paul, French pseudonym of Johann Paul Friedrich Richter (Wunsiedel 1763 - Bayreuth 1825), German writer and pedagogue.

²Pervasive Games are video games where the gaming experience is projected into the real world, or where the fictional world in which the game takes place mixes with reality. The mobile game company "It's Alive" defines them as games that surround you, while Montola, Stenros and Waern in their book *Pervasive Games. Theory and Design. Experiences on the Boundary Between Life and Play* (2009) argue that they bring with them characters that extend Huizinga's magic circle temporally, spatially, and socially



Fig.1/ Mario, one of the Introbots

Introbots, akin to introverted individuals, exhibit a nuanced array of responses to environmental stimuli, which is represented through a certain amount of brightness, and a tendency to escape such stimuli and to search for darker places where to 'relax'. The bots are designed to deliver small games or experiences to sensitize participants to the notion of introversion without declaring that purpose from the beginning. The whole idea behind the project is a learning-by-playing experience where the players, questioning themselves on the dynamics behind the bots' behaviour can slowly discover their personality and, specifically, their introverted traits. In the first deployment of the prototype, four participants were given a torchlight each, divided into teams of two, and led into a dark room. Four robots are waiting there, a pair for each side of the space. Their LEDs are glowing as if they're relaxing and chatting with one another. Players are told that the objective of the game is to bring the Introbots to the centre of the room, but this is much more difficult than it seems: the robots are scared of lights, they often run away, they get confused by the shadows and by the other players' torches. Sometimes they panic and start spinning in random directions until they find a dark place where they can recharge themselves from the abundance of external stimuli (light=social interaction), they have been facing. The deployment phase was organized in three different sessions, each one followed by a survey where the players were slowly invited to reflect on the bots' behaviour through some specific questions until they understood the specific personality trait they were expressing. The first sessions in Amsterdam were quite successful. Around 50 people were involved and almost 80% of them understood the purpose of the research starting from the second survey and interaction with the bots. The surveys were composed of a series of questions of growing specificity enriched by some psychological and behavioural hints. After gathering the data, the team started to reflect on how the Bots could be used not only in a descriptive way to sensitize towards the topic of introversion but also as a 'design' device to challenge designers towards new ways of designing public spaces and urban landscapes taking

³ *Introbots (2017-2018)* is a project developed by a team of students of the Master in Digital Design at HvA (Hogeschool van Amsterdam) and composed by Adriaan Oudemans, Anandita Punj, Beatriz Ibeas, Carmen Scherbaum, Edwin D'Mello, Gabriela Pratteringerová, Lena Heinrich, and with the supervision of Dr. Gabriele Ferri and the consultancy of Valerio Perna.

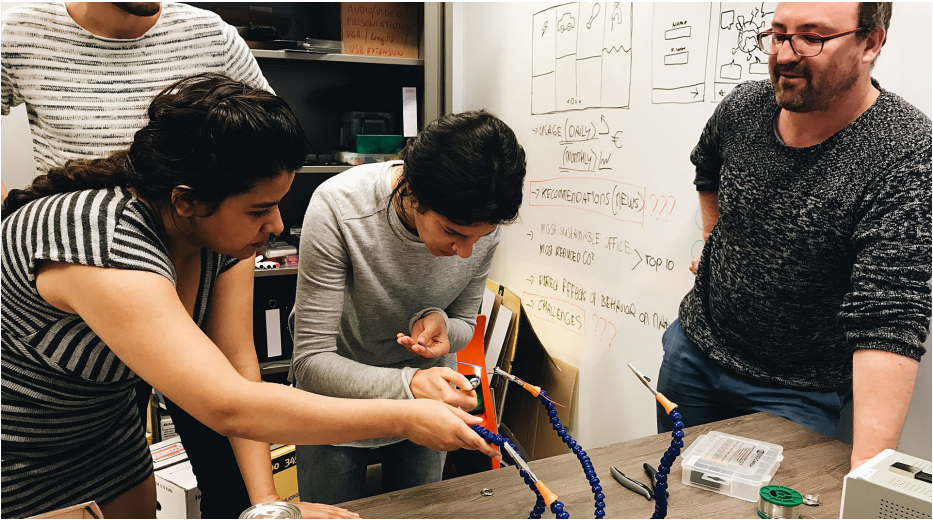


Fig.2/ The creation of the Bots. In the picture: Soldering. Anandita Punj, Beatriz Ibeas, Adriaan Oudemans, Luis Rodil-Fernández

into account the variety of psychological profile enriching them day by day. The chance for this further step came when the team was invited to an uncommon workshop in the South of Italy, at the School of Architecture for Children (SOU) in Favara, province of Agrigento.

SOU Favara. Creating Better Citizens for the Future

The School of Architecture for Children (SOU) is an after-school experience for the children in the framework of Farm Cultural Park, an independent cultural centre in Favara, a temple of art, culture and beauty.

Favara has long been one of the Italian municipalities most affected by mafia activity. Its creators, the notary Andrea Bartoli and his wife Florinda Saieva took the opportunity from the confiscation of some assets from organized crime for the foundation of the Farm Cultural School which aims to be a center of beauty in an urban context tormented by crime organized and an opportunity for redemption for citizens. To date, the Farm is one of the most influential independent cultural centres in the contemporary cultural world and one of the most effervescent projects for the rethinking and rebirth of moribund cities.

It is the winner of countless awards including the prestigious award from the American Foundation of the same name Curry Stone Design Prize, as one of the 100 international experiences that have produced the greatest social impact in the world in the last ten years. The architecture school for children therefore falls within the framework of this initiative with a very simple but high-impact pay-off: Create better citizens for tomorrow. Throughout the school year, children are invited to participate in educational modules, lasting approximately 2 days, with invited teachers from all over the world. We move from the use of sustainable materials for construction to the design of green public spaces up to experiments with intelligent sensors within urban areas. Among the guests of the 2017-2018 school year, there was also the HvA team, which was asked to organize a module that taught children how to design inclusive and sustainable urban playgrounds. The opportunity was used to focus the workshop on the research interests of the Amsterdam students, broadening the focus on the concept of inclusiveness on the theme of introversion and using robots to push the young students of the school to design not just an inclusive playground but one specifically dedicated to introvert introverts. The work took place in two phases: the first was



Fig.3/ Farm Cultural Park, Favara. The courtyard and main entrance.

theoretical where the teachers explained what a playground is and what the key elements are for their design within cities. The concepts of urban play devices were presented and the importance of designing spaces that can invite performance and unpredictability, which can push the user to freely express their desires for interaction and play. The second began with a simple request: the children's design of their playground. Blank sheets of paper, pencils and markers were provided and the young students were encouraged to draw what, in their minds, could be the most beautiful playground Favara had ever had. At this point, the robots had not yet been presented, as the first design phase had to be as free as possible from any form of external influence.

Once completed, the children were divided into 6 groups of 4 and taken to the room where the robots were waiting for them. After a short presentation (each robot has a name and its personality) the students were asked to organize a small playground with common objects - chairs, tables, cardboard boxes - and to help the robots play.

The room was in semi-dark condition so as not to influence the behaviour of the robots before the experimentation and a series of small flashlights were provided to the children. They were not told how to use them but little by little they understood that it was the flashlights that stimulated behavior in the Introbots.

After each play session, the children were asked questions about the robots' behaviour. As to why they seemed to be running away and how they used the flashlight to make them move. Initial responses to the questionnaire showed an understanding on the part of the little players that 'something was wrong' but the general impression was that the Introbots were broken or malfunctioning. Having confirmed this, the team of teachers and students suggested to the children that perhaps the bots were experiencing emotions that they could not explain and to think about this during the second gaming session. At this point, the children were invited to redesign and modify their initial park in light of the behaviour of the robots, thinking about how to ensure that they could have fun despite their 'strange' behaviour. Once finished, a new play session with the Introbots began albeit in a different way than the previous one. The children seemed more aware of the impact of light on the robot's behaviour and, in cases where the robot ran away to take shelter, rather than chasing it, they remained still and waited a few minutes before starting to 'communicate' with it again. During the second questionnaire interview (all recordings were catalogued and analyzed after the end



Fig.4/ The human team and the Introbots

of the workshop), a boy and a girl progressively revealed the mystery behind the bots' behaviour. The first at a certain point stated that his robot (Mario) is shy and needs 'time' to get to know each other and for this reason, he had decided to play with him for shorter times to give him time to get to know each other.

The little girl, for her part, began during the interview by stating that her robot (Anne) was 'introverted', meaning that, from what she knew, it needed to recharge after 'talking' to people as it was a bit shy and he also needed time to spend alone before returning to play.

Conclusions

As we have seen through all the work presented in this paper on the robots, people in Amsterdam and the children in Favara have critically engaged with the nuanced portrayal of introversion encapsulated within the Introbots' narrative arc. On one hand, the cute robots aim at raising empathy and affection in the players and, on the other hand, the game signifies how tiresome it may be for introverts to function in everyday circumstances. The Introbots are neither shy nor lonely: indeed, they start in pairs and end the game in a group in the middle - but find the process of getting there exhausting and sometimes anxiety-inducing. They transcend simplistic notions of introversion as mere shyness or solitude, instead embodying a complex interplay of social dynamics. Beginning their odyssey in pairs and culminating in a collective convergence, they symbolize the intrinsic desire for connection and communal belonging that resonates within introverted individuals, albeit amidst the taxing ordeal of interpersonal engagement. Furthermore, the Introbots beckon stakeholders within the educational sphere to engage in a discourse that celebrates the diversity of cognitive temperaments, fostering an inclusive environment wherein the multifaceted nature of human experience is embraced and celebrated. The Introbots don't offer any "solution" and don't judge anything or anyone. Instead, they pave the way for educators and students to reflect on the misconception that extroversion is positive and introversion is a disadvantage. Together with their ability to communicate and raise awareness of this topic, in Favara they also demonstrated their ability to be artefacts capable of involving people in design thoughts regarding more inclusive urban spaces tailored to the different personalities who inhabit them. After the children discovered the introverted component of robots, their designs for the playground



Fig.5/ Photos from the workshop phase.

changed significantly compared to their initial choices. In one case, a child designed what he called 'the heart of the park' as a private dark room where his robot could go to rest when its level of social interaction exceeded the permitted limit. In another, a little girl had designed a series of urban seats that could accommodate a maximum of 3 people so that her robot could control her stress level through contained and time-limited interactions. These are small experiences within research that aim to be non-solutionist and do not want to offer solutions in the form of guidelines but mainly to explore certain social and educational dynamics through play and playful interaction. Since the beginning, the work was driven by an honest curiosity to test the potential of playful artefacts to lead to some meaningful discussion on a theme such as introversion and then transform it into design material for the urban landscapes of our cities. The results of the workshop with the children of Favara showed that, even though more testing and experiences are needed, the power of play can empower and enhance younger generations deeper reflections concerning the urban spaces they inhabit.

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Façade's definitions through architectural transitions.

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DOI: 10.37199/c41000702

Abstract

The definition of the architectural term “façade” will be addressed in this article, as a relatively new term and not very much explored in the vocabulary of architecture definitions. With globalization, homogenization of the environment, all places seem to look alike. We are losing to a great extent the beauty and richness of this of cultural expression through the architectural façade. Within the sections that follow, the architectural façade will be examined and defined as a term, as an architectural concept, and as an architectural element. The alterations of the facade as an architectural element will be described in this article. The methodology applied to describe these concepts is based on the description and analysis of some emblematic architectural objects in the international architectural field. The transition moments regarding the architectural concept of the façade will be illustrated with two examples: “The EasFaçade of the Louvre” and the “Crystal Palace”. Both these examples demonstrate the evolution of the notion of the architectural façade, through transition architectural moments. Also, the key element that has altered how a façade appears is the explanation of the detail and ornament in the architectural façade. The “ornament” was not only lost in the early 19th-century modernist architectural movement, but it was also removed, altered, and assumed other shapes by different architectural language developments. The ornaments that were put to the exterior facades in limitless numbers and sizes are now thought of as things that may be placed in any home, similar to the furnishings in an apartment. The two contemporary architecture icons, Adolf Loos and Le Corbusier, provided the architectural interpretation of this modernist movement through their renowned creations, Villa Müller by Adolf Loos and Ville Savoye by Le Corbusier. These façade alterations are outcomes of a blending, processing, or interchange between several disciplines and the instruments employed to discern the definition of the architectural term “Façade”. There are two sides to the façade, it's not just the outward face but the inside surface. At the meeting point there are these internal pressures of program of space of circulation of structure, external pressures of site, context, orientation, approach. The façade has a relationship with the populace, the context, but also to the cycle of decay and rebirth that one finds in the natural environment.

Keywords: Architecture, Definition, Façade, Interchange, Processing, Transition.

Definition

Façade – the front part or exterior of a building

This is the definition that exists mostly in any dictionary. Probably for a few hundred years. The front of a building, especially an imposing or decorative one. Now, hidden within this is a supposition, presumption that a building has a front. If it doesn't have a front maybe it doesn't have a façade. The idea of imposing or decorative, the façade is given some treatment hierarchically that distinguishes it from the rest of the building. Normally, most buildings with façade this defini-

tion applies. This is a subsidiary definition to it that goes like this: Any side of a building facing a public way or space and finished accordingly. This begins to open up to the door to the possibility that any surface of the building can be considered a façade. Now we can admit to the fact that a building can have not only a front façade but a back façade or a side façade. But this says that any side of a building could possibly have a façade but does have the qualifying requirement that it faces a public way or space. That simply tells us there is a contingent and codependent relationship between façade and public space. If you take one out of the equation, either the façade or the public space, you lose presumably the other (The architecture of the façade, Korman 2023).

Façade a – the front of a building / an imposing or decorative one.

b – any side of a building facing a public way or space and finished accordingly.

There is a disturbing trend in some dictionaries away from the standard definition. An authority no less than the Oxford Dictionary of architecture says this external facing, especially the principle façade, means you can, if it's not the principle façade, almost any surface can be considered a façade (The architecture of the façade, Korman 2023).

“... a facade frames and enhances the point of intersection of interior and exterior space, dividing but also allowing passage between contrasted functional and symbolic realms.” – Charles Burroughs.

It's that depth of the building that really illustrates the idea of that zone of transition from the inside to the outside. Something that we don't think about as much as we should, what is sometimes referred to as the liminal transition of movement from the outside to inside. How façade can serve as an agent for making memorable moment of transition, preparing you for the experience when you leave the public realm and arrive into the private realm, or vice versa (The architecture of the façade, Korman 2023).

“...the façade, then, is a place where, in service of rhetorical effect, the corporeality of architecture is compromised” – Charles Burroughs.

When you design a façade, always remember there are two sides to the façade, it's not just the outward face but the inside surface. At the meeting point there are these internal pressures of program of space of circulation of structure, external pressures of site, context, orientation, approach (The architecture of the façade, Korman 2023).

“I would say that architecture occurs at the meeting of particular interior forces of use and space, and particular and general exterior forces of environment. Architecture as the wall between the inside and outside becomes the spatial record of this reconciliation and its drama.

This is one of the most beautiful quotations about the architectural façade. Nowhere is the word façade. In its place is the word architecture (The architecture of the façade, Korman 2023).

Colin Rowe: “...the vertical surface can only remain the threshold of understanding. For while the plan, as a document addressed to the mind, will always be the primary concept, the vertical surface, as a presentation addressed to the eye, will always be the primary percept, will never be other than the beginning of comprehension.”

Colin Rowe: FACE “...except for Le Corbusier from time to time, face was never a preoccupation of modern architecture. Nor was face, as the metaphorical plane of intersection between the eyes of the observer and what one may dare to call the soul of the build-

ing (its internal animation) a notable component of eighteenth century understanding.”

One way to think about the façade is as a projection plane. On the outside are projected those things relevant to the context the façade finds itself within. On the inside are those things that are relevant to internal concerns. Those relevant to the internal concerns can find their way out to the surface of the building so that you do get some sense of internal organization, and vice versa. This is Colin Rowe who has written extensively about the architectural façade (The architecture of the façade, Korman 2023). ... *“(The façade is) ... the metaphorical plane of intersection between the eyes of the observer and what one may dare to call the soul of the building. (it’s internal animation) – Colin Rowe.*

...”A façade may qualify primarily as an out surface, aesthetically and compositionally part of the street or square in which it stands, and carrying various kinds of information and cues for decoding by different interpretive communities.”

This is a role that these days is becoming more and more scarce, in that with globalization, homogenization of the environment that all places seem to look alike we are losing to a great extent the beauty and richness of this kind of cultural expression through the architectural façade. An example of this, a contemporary one, very modest building, is the library that can be found outside Beijing, in the hills. The library and the façade presents itself as this reticulated surface with a balcony, a little arch way on the right, stones pass through it, a stone garden passes underneath the library and it sits in front of a pool. The wall is steel frame and embedded in the wall are these twigs. The twigs were gathered locally and are significant to the people who live in the village. These are twigs they gather for their cooking purposes, for heating purposes. This is designed so that as the twigs deteriorate over time, they will rot and fall away, they can be replaced. So the building not only speaks to its relationship to the populace, it speaks to its relationship to the context, but also to the cycle of decay and rebirth that one finds in the natural environment (The architecture of the façade, Korman 2023).

...”In the Pre-Modern city the facade mediates between the public and private realms. It is both public closure and private sign. In the Modern city open space absorbs any urban idiosyncrasy, and because street has disappeared as an enclosed space, the facade becomes only private sign rather than public closure as well” – Michael Dennis (arch) in his book “Court and Garden.”

Facade as a term

Despite being extensively used in architectural theories, the term “facade” is relatively new in English. The term first appears in print in 1656 and refers to how a house’s façade is presented. This word had both unfavorable and inaccurate meanings by the end of 1933. Its root is the French word “face,” which developed from the Middle French term “visage,” which means “what is presented.” The word “gevel” (facade), which is derived from Old Dutch and refers to the axes of the earth and is based on the Old Slavic name for the human skull and bone structure, has been used in Dutch since the 15th century. (Façade, Rem Koolhaas, et al. Page 6).

Facade as an architectural concept

“The longer you look at a ‘word’ the stranger it looks”- Karl Kraus. This phrase perfectly describes the word “Façade.” The word is derived from the building’s façade or front. When compared to the building’s structural components like the floor, wall, roof, and columns, the facade concept is a successor. The façade wasn’t given much attention by architects until the 18th and 19th centuries. With the modernization at the turn of the 20th century came the de-conception just after its conception (Façade, Rem Koolhaas, et al).

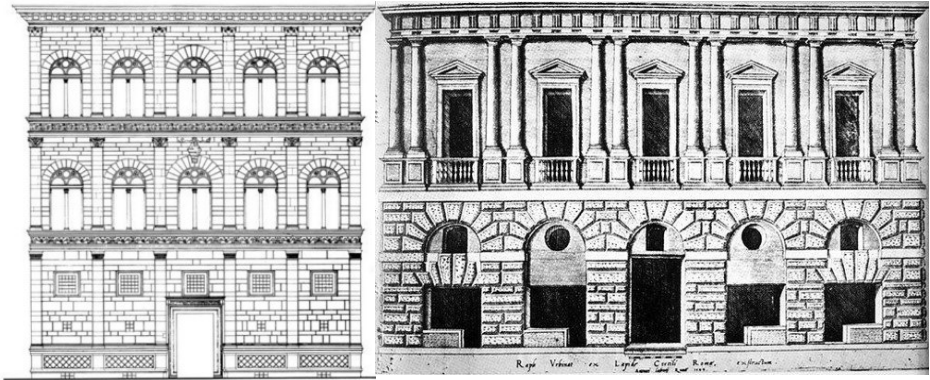


Fig.1, 2/ Alberti's Palazzo Rucellari - 1446, Florence, Italy Bramante's house for Rafael -1500, Rome, Italy.

1. The order of the columns, the superimposition, the colossal order. The facades of classical architecture have been constructed in the west for millennia and ages without the right language for their components emerging. Werner Oechslin postulated in the 1980s that rather than being a planned design, the façade was more of a byproduct of bottom-up processes. The word “façade” has become so commonplace to us that we have forgotten that, unlike many other (Vitruvian) architectural terminology, it has a precise definition that may be interpreted as a collection of various situations, from design guidelines to aesthetic principles of architecture. Columns, capitals, timber embellishments, and ornamental features received the majority of attention before the façade was thought of as a field with a distinct theoretical perspective. Without any sort of holistic relationship, the components of the façade were coded separately. It was an induced idea rather than a deduced one. It only becomes a more generic idea after following a general route of development and independence. The column is regarded as the most significant component of a classical western façade. The writings of Vitruvius contain descriptions of the three Greek ancient orders. Books three and four of his “Ten Books” on architecture expose us to the Ionian, Doric, and Corinthian order as well as the Tuscan (Roman type) (30 BC). Theorists of the Renaissance then codified these ideas into laws. The Order of Composition was added by Leon Battista Alberti in 1452, bringing the total number of traditional Vitruvian orders to five. Sebastiano Serlio sanctified the classical orders a century later. The entire collection of the five commands has been passed down from father to son. The most significant component of what would later be known as the façade, the column, has been constructed using two principles. The first is known as the “Superposition” (It was practiced in ancient Rome where different types of orders were mixed in the same façade, placed in rows, on different floors, according to different orders, starting from the Doric order, and following them from the Ionic, Corinthian one - the case of the Colosseum in Rome). The “Colossal” is the name of the second principle. In this instance, the building’s whole façade is covered in columns in the same arrangement. A frontal system was created in architecture when the Colossal concept was applied to several different buildings. This system was simultaneously exposed to and combined with architectural features and ornamental forms. The cult of purification has been interpreted as Colossal, Superimposition, and Order. (Façade, Rem Koolhaas, et al. Page 36, 37, 38)

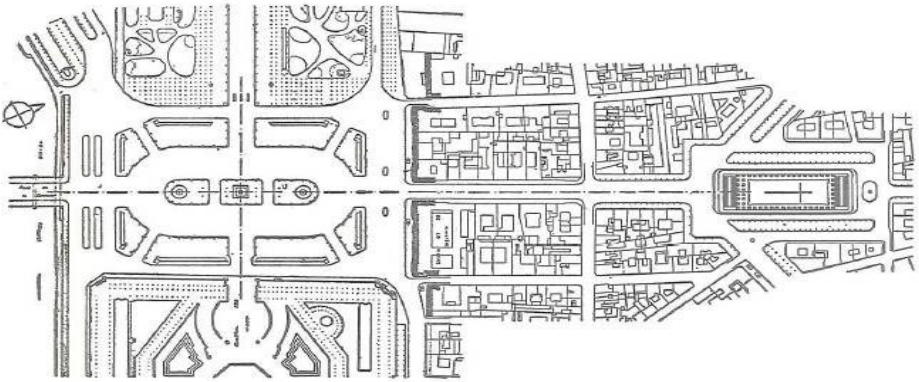


Fig.3/ Plan of "Rue Royale"

Facade as an architectural element

"A cultural movement against the historical-cultural backdrop that had prevailed up until that point occurred in the 18th century. The architecture was altered, the temples' "Temenos" disappeared, and "Classicism" as a whole was rethought. As mentioned in (*The Origins of modern town planning – Leonardo Benevolo, page 15*), the architects only created the architectural portion of the façade at Place de la Concorde and Rue Royale; the structures will be reconstructed decades from now. Regarding the regime of Classicism, streets, squares, and neighbourhoods were reconstructed (*The Origins of modern town planning – Leonardo Benevolo, page 15*). The historical significance of temples, or "Temenos," started to wane during this era. The customary benchmark for holy temples shifted. Cities, notably Paris under absolutism, which was exceedingly artificial and resembled a collection of shoots, followed the buildings of the Acropolis or the Roman Forum, which may have been classified as unconnected structures. In this way, the conflicts between the temples were replaced by those between a facade that, from the outside, resembled a temple and the structure that grew behind it. It appeared as though the Classical Temple had become a part of modern cities. The etiquette has evolved into the "doctrine of character" over time. With the help of contemporary effects of aesthetics, whose tools include the theory of perception, physiology, and psychology, this ideology sought to harmonize the exterior look with the function of the structure, in terms of architecture. The "façades" beginnings are depicted in this description. (Façade, Rem Koolhaas, et al. Page 40). When adjectives like "elevation," "envelope," "skin," and "membrane" are used in place of the term "facade," the issue of the term's modern definition becomes even more complicated. They may refer to parts of a façade, but they are not the facade itself, it should be made explicit. Architectural elevations are technically an orthographic projection convention for frontalized representation of the building surfaces, allowing the observer to see the undistorted relationship of the components to the whole. The terms "envelope," "skin," and "membrane" all refer to the physical covering of the building, without specifying which surface would be considered the main face.

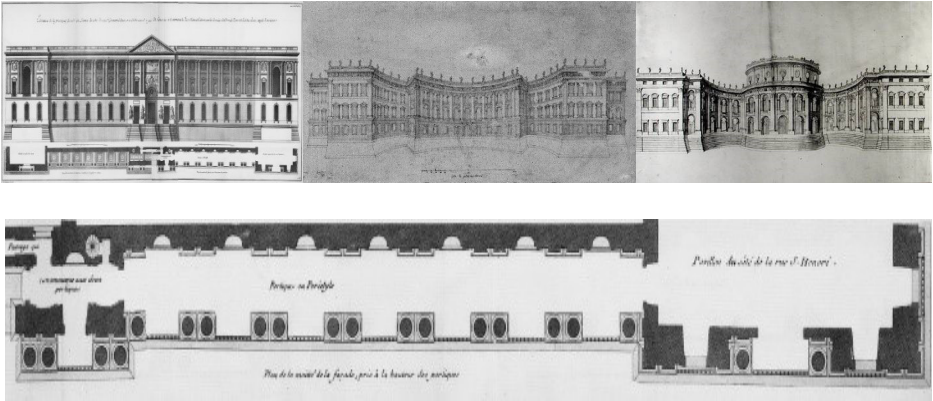


Fig.4,5,6/ Version I, Version II, Final Version
 Fig.7/ Section of the final version

Architectural Transition moments

I. East Facade de Louvre: It is a model for succeeding palace designs, a monument linked to the beginnings of modern architecture, and a shining example of the strict architectural tradition in French classicism. Regardless matter where it is located, the façade receives a lot of attention because it was originally intended to be the major, ceremonial entry of the palace. The Louvre through the centuries

The Louvre has undergone several additions over the course of 800 years to become what it is today. While the Louvre is currently in the heart of Paris, it used to be on the western outskirts of the city until the seventeenth century. The lengthy façade is composed of two pavilions, one at each end, and a central entrance with a pediment. This design is based on the five-part French palace type. The pavilions do not rise higher than the wings, as was customary; instead, they project somewhat forward from them. Only the center pavilion’s low triangular pediment, which is accented and softened by a handrail, deviates from the rigorous horizontality of the roofline (continuous railing). The exquisitely wrought low-relief sculpture on the end pavilions is reminiscent of Roman triumphal arches. The bottom floor’s windows, which are used to create visual continuity with the earlier portions of the Louvre and strong visual support for the top colonnades, were designed as a sturdy foundation. Classical orders

Along with the façade’s horizontality, the twin porticos’ double columns—covered corridors or porticos along colonnades or sunken wings—mark a break from previous royal structures in France. The Corinthian columns provide a firm and consistent rhythm to the whole façade. The columns’ position opposite the deep porches and the contrast between their light and shade provide aesthetic interest. Columns are used in a variety of ways. For example, although they are set back from the wall in the colonnades and central pavilion, arranged columns are used around the central windows and as pilasters at the pavilion’s margins. The design’s most shocking feature at the time was its use of paired columns. Vitruvius and Renaissance authors devoted a significant deal of attention to the problem of column separation (also known as intercolumniation). A little figure included in Claude Perrault’s translation of Vitruvius’ “Les Dix Livres d’architecture de Vitruvem” depicts a row of four equally spaced columns. An ancient temple’s usual intercolumniation looks like this. Perrault demonstrates how each column has moved in the direction of its neighbor to the left to create the Louvre colonnade design.

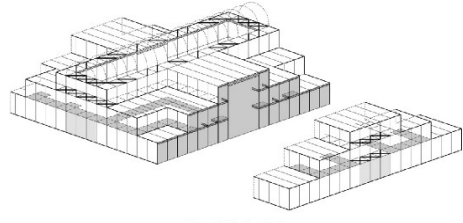
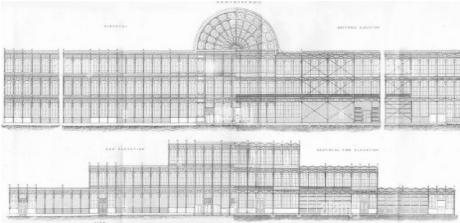
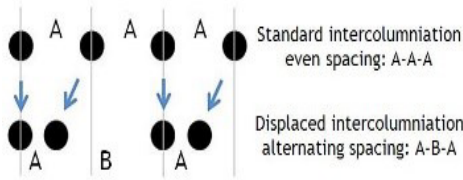


Fig.8,9/ The intercolumniation
 Fig.10,11/ Crystal Palace

The two gaps between each pair of columns (B) and the narrow space between each pair of columns of each pair are given the most attention by moving half of the columns to produce the two-column pattern (A). Instead of the relatively static A-A-A beat, this produces the dynamic visual rhythm, A-B-A. The sixth form of intercolumniation of the classical Order, which produces a wider division than normal, is, in Perrault's opinion, a valid creation. Vitruvius, a famous Roman architect, had described five perfect forms of column division; Perrault asserted that the Louvre represented a new type appropriate for contemporary French taste.

II. Crystal Palace

Paxton created the Crystal Palace, which was 563 meters long and 39 meters tall, as the site of the first World's Fair. It was the biggest glass structure ever constructed at the time.

The Crystal Palace, which was finished in 1851 to accommodate the Exhibition of All Nations in London, was the first major public structure to fully eschew conventional building supplies and techniques. The construction was built with prefabricated iron columns and girders that were constructed on-site. The entire structure was based on modules that were 1.2 meters tall and 25 centimeters broad, the size of the biggest mass-produced panes of sheet glass.

After a six-month display in Hyde Park in central London, the structure was demolished and rebuilt on Sydenham Hill in south London. The region is currently known as Crystal Palace after the building. A fire destroyed the structure in 1936. As Norman Foster says for an architectural magazine: "That was the birth of modern architecture, of pre-fabrication, of soaring spans of transparency. That was truly a seminal building. And I remember saying: "That is truly high-tech."

Crystal Palace encapsulates the 'form follows function' idea that became synonymous with modernism in architecture. Using new methods and processes to create previously unseen designs, Paxton ensured the exhibitions within the Crystal Palace would be housed in a structure that, itself, symbolized the triumphant wonder and possibility that modern design, technology, and engineering presented.

III. Ornaments and details in architecture

What happened to art?

In terms of technology and aesthetics, what was going on in European cities at the time? Antonino



Fig.12, 13 14, 15/ Umberto Boccioni, 1912. Giacomo Balla, 1912. Marcel Duchamp, 1911 Antonio Sant'Elia, 1914

Saggio's "Architecture and Modernity" presents the three key current indications that fueled the modernist movement:

I - The "moral" revival of taste, fighting against decorum.

II - Acquisition of new construction techniques (cast iron, iron, steel, and concrete) that theorize the industrial world's importance.

III - The pursuit of an aesthetic that is consistent with industrialization. The response to simplicity, to the emergence of a new regulating force for a man of his time, was also profoundly tied to classical (Greek) purity, according to architect Peter Behrens.

What of the ornament? How did it shift from the ornamentation to the modern facade's details?

The author Alina Payne reflects in her book "From ornament to object" that despite the conflicts posed by Adolf Loos' essay "Ornament and crime" and Le Corbusier's "Le Modulor," where the ornament is forcibly rejected, open in the direction of modernism, the architecture of the exterior detail did not suddenly vanish but rather changed and assumed new forms. The ornaments that were put to the exterior facades in limitless numbers and sizes are now thought of as things that may be placed in any home, similar to the furnishings in an apartment.

The "ornament" was not only not lost in the early 19th-century modernist architectural movement, but it was also removed, altered, and assumed other shapes by different architectural language developments.

For the author Alina Payne, this shift was the outcome of a blending, processing, or interchange between several disciplines and the instruments employed to discern those meanings. What is the relationship between this renewed interest in external detail and the removal of embedded, glued-on ornaments? Is one a stand-in for the other when the other is absent?

The two contemporary architecture icons, Adolf Loos and Le Corbusier, provided the architectural interpretation of this modernist movement through their renowned creations, Villa Müller by Adolf Loos and Ville Savoye by Le Corbusier. These façade alterations are outcomes of a blending, processing, or interchange between several disciplines and the instruments employed to discern the definition of the architectural term "Façade". The façade has a relationship with the populace, the context, but also to the cycle of decay and rebirth that one finds in the natural environment.



Fig. 16, 17/ Basilica di Santa Croce, Lecce, Italy.

Fig. 18, 19/ Villa Müller, Adolf Loos, Prague, 1930. Villa Savoye, Le Corbusier, Paris 1930

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Vision and Imagination in Urban Planning

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DOI: 10.37199/c41000703

Abstract

“Life is very complex. Don’t try to find the answers, because when you find them, life changes the questions.” (Unknown)

“I am enough of an artist to draw freely upon my imagination. Imagination is more important than knowledge. For knowledge is limited, whereas imagination embraces the entire world, stimulating progress, giving birth to evolution.” (Albert Einstein, 1924)

Within the realms of sustainable and resilient territorial and spatial (urban) planning, the pivotal role of Vision and Imagination emerges as a decisive factor for genuine and effective outcomes. Urban planning, inherently a technical tool, unfolds within a multidisciplinary framework that converges into a comprehensive synthesis of plans and explanatory materials. This complexity extends beyond a mere enumeration of stages or degrees of final approval, as the resultant framework is submitted to central or local governments. Their role encompasses not only adherence but also the oversight and control of the document’s execution, a document that serves as a guiding force for necessary transformations and investments in the planned territory. The objectives of planning primarily center around extensive terrains, necessitating prolonged periods of study and design. The implementation itself unfolds over a relatively extended timeline, commencing with the examination of local plans, urban development plans, city plans, and progressing to regional plans. Acknowledging the inherent dynamics and potential alterations in final indicators and goals during the sustainable and resilient planning processes, it becomes imperative to establish a vision early on. It is in this context of necessitated vision and imagination that we present our perspective in this paper.

Keywords: *Imagination Planning Resilient Sustainable Urban Vision Architecture / City / Form / Morphology / Postmodern*

Introduction

The material prepared for this symposium has an added emphasis on the meanings embedded in terms usually used in other disciplines, such as ‘VISION’ and ‘IMAGINATION’, in the knowledge and the production processes of urban planning. We stand by the notion that the concept of VISION lays at the axis of mid- to long-term urban planning. Vision here refers to the conceptual scheme of an imagined future in the urban environments. IMAGINATION is the medium in which to materialize this imagined future. An urban planner is not merely a technician, but a Visionary as well (‘looking-far’ is the key concept in the previous sentence to ‘urban planning’), and the course and outcome of urban development demand such foresight. For the practice of urban planning, this means that it is not sufficient to just look at statistics, at surveys and past precedents. Time is lived and, as a result, what has been collected as data becomes unreliable and too subject to specific events. It needs to be recast and viewed through a more visionary lens. ‘Life is very complicated. Don’t try to find the answer because when you

find the answer LIFE changes the question.' Here is where Vision comes in – subjective, but allowing us to add a touch of refinement to our understanding of the urban condition, connecting it to the ultimate goals of urban studies towards which we cobble our comparative findings. These principles map almost everywhere, from micro-scale local initiatives to the macro-scale of national strategic frameworks. Indeed, we could say that urbanism itself is visionary by nature. How Vision and Imagination have been used by some of the great urban designers throughout history to shape and define the built environment, is usefully illustrated in some classics of urban planning such as Lúcio Costa's 'CITY PLANNING OF BRASÍLIA' and Le Corbusier's 'VILLE RADIEUSE'. Although the latter has not been realized due to its modernist and technical futuristic utopian character, certain strands of it remain pertinent to the amazing developments in growing metropolises such as Dubai, for example. This was a visionary piece of work in that Le Corbusier looked ahead in terms of innovative circulation strategies and the provision of public spaces that could be accessible and used by the majority. Though there are many others, these two illustrations emphasize the way in which Vision and Imagination could change the shape of the modern metropolis.

Esteemed Colleagues

We, Eno and Gjergj, are proud to share this material with you, having been committed to engage in an honest and more pragmatic approach in the evaluation of the current challenges – and practice – of urban planning, with the aim of making the construction and development of our cities more sustainable. We've recently dived into some disruptive modern views through the lens of 'A Global Benchmark of Urban Risk, Response, and Recovery', looking at the 'Resilient Cities Index 2023'. Developed by the Tokio Marine Group and a team of international experts, this report analyzes the challenges that will characterize our cities up to 2050. According to its findings, two-thirds of the world's population will likely be living in urban areas by then, and thanks to the predictions of natural disasters such as floods and higher sea levels, much of that development will be under threat in the coming years. And yet, it is clear that this material has been gathered, organized, and analyzed very carefully, based on a variety of technical, economic, and environmental variables that also connect to urban development and spatial planning, and are embedded in questions of sustainability. Scientists, in particular, have been attentive and innovative here in drawing on their scientific knowledge and profitably using these insights to forge a path towards goals that, thankfully, rarely leave much room for error or random opportunity.

The number that jumped out at us was the 2050 timeline, which includes a vision for how things should be, especially in terms of basic need capacities in mega-cities that cannot currently financially support development in basic services and infrastructure – a significant problem in mega-cities in Africa and South-East Asia, though not for mega-cities in Europe traditionally. One-third the global population will be in mega-cities, including in countries below a 2 million population.

We feel a professional responsibility tempered by relief that we are acting in accordance with the needs of the times. Sure, we feel the weight of moral responsibility, but we can also feel the weight of cities lifting from our shoulders.

Sadly, there is little chance that we will see this type of serious Albanian government commitment to the science of territorial planning that would include studies of every type at all the scales. Prior to 1990, such a structure was almost in place, with urban studies (reversible in time) of every city, village or residential center, plus additions to old studies every 15 years and new studies for every generation. There were also regional and thematic national studies envisaged with a period of 25 years.

Therefore, today we have inherited cities with a highly concentrated but free-flown structure suitable for sustainable development, whereas small cities have grown down due to the depopulation that is

still ongoing for immigration reasons. One of the main factors of depopulation in Albania, is the opportunities for a life in an developed country, which has a greater weight for young Albanians. This brutal and unjustly uneven competition is creating a decided lack of vision in the way our cities prepare for change. A vision that guides investments and developments in all its aspects and in all sectors can help create opportunities for employment and a decent life for all inhabitants. The impact of urban planning, especially of the capital, is the greatest when there is a huge gap in income distribution.

The rise of a wealthy class which turned the ideal of a 'unified city' almost a utopian vision, is most evident in the capital city where you can feel the social disconnect, and notice the urbanization of large-scale gated living areas. Although ranked lower on Resilient Cities Index 2023, the 24/7 drinking water and sustainable integrated development is still lacking in the capital. Territorial and structural planning of the suburbs is missing beyond 'The Great Ring Road of Tirana', the ring road whose completion will change traffic patterns in the roads surrounding it.

More worrying is the lack of affordable family housing, both through lack of purpose-built housing and an excess of informal settlements. There is an intriguing phenomenon here which would bear investigation in order to explore underlying causes. The issue involves people moving into cheap rented dwellings, but also concerns broader social issues, especially in the megacities of Central and South America, and of Africa, where these problems are becoming profoundly serious.

Today is that pivotal moment to turn to the past to rediscover the "Great Ring Road of Tirana" and how it was conceived in the "Regulatory Plan of the City of Tirana", C.M. Decision No. 45 on 07/02/1990, one of the greatest utopian visions ever put into practice in Tirana. A utopia that became reality. Although, Boulevard 'Zogu I' which was planned to extend even more towards Paskuqan, Kamez and to the Mother Theresa Airport stands as a testament to the success of this regulatory plan. Still, this Plan remains a contribution to the urban planning and zoning of Tirana while promoting a sustainable development that never seemed to fade.

By finishing this task now, the Great Ring Road not only further solidifies the urban form to control movement trajectories but also creates a corridor for housing expansion to the more environmentally conducive areas in the east and the northeast of Tirana. This way, the city is made denser and greener, and thus leads to more controlled development. Whether this direction-setting for housing development will be materialized by meticulous planning and studies remains to be seen. How eager and capable the local government is will also be a determining factor of achieving this grand Vision.

Meanwhile, at the same time some alarming trends emerge. The unintentional efficient forms and direction, without any serious local studies and a solid vision, created the strange phenomena of skyscrapers built in the center of the capital, the unexplained phenomenon of building housing, mass buying of newly built apartments without being lived in, and increased real-estate rates in areas where people live. These phenomena must be thoroughly explained by the relevant authorities and the state councils, though surely they seem not relevant to the discussed goals in this paper. These phenomena, however, are part of the reality of what is taking place in Tirana.

The city where Tirana ranks as second weakest for development in Europe and fourth weakest in the world – meanwhile, its population is only going to continue rising in the years to come. The city urgently needs help in managing its growth in sustainable and self-reliant ways.

Basic human needs are still unmet These include 24/7 supply of drinking water and green spaces and playgrounds, especially for vulnerable age groups, public health and air quality, people's wellbeing and, in general, how people live. Again, Tirana performs below the European average. We're also losing valuable open spaces, parks and green areas, especially in the inner-city zones. It goes without saying that air-quality data exceeds the level considered acceptable by specialized agencies of the Council of Europe.

Compounding this situation are the glaring challenges of a structural absence of vision 'for what kind of Albania do we want to live in.' The intricate and critical realities of two key phenomena, both the large demographic shifts and the consequences of the changing urbanization dynamics, must be carefully analyzed and critiqued.

Despite the urgent need to produce data-driven insights, as of yet the official announcement of the 2023 Census indicators – including those relevant to urban development, such as the flows of population and changes in building status – are pending. Unofficial announcements state that the tendency is upward as far as the population of Tirana is concerned. And it is in fact growing, as the population of Tirana will reach 1 million inhabitants. Most importantly, this reporting is an alert as to the increasing concentration of residents in one city, while the rest of the population of the country is spread thin over the territory. Every year an additional 25,000 residents (more than the actual increase in the population in the whole country) populate Tirana. This is the second alarming demographic marker: an alarming demographic indicator is accentuated by the phenomenon of emigration among the working-age population.

We stand on the threshold of an era in which the sustainable development of cities, villages and any residential centers is at a standstill. Building or renovating houses in regions outside the coastal zones is merely a temporary solution to this grave problem. This evaluation might come across as pessimistic, but it unfortunately reflects the truth. However, the foundations of sustainable construction and development are still hopeful almost entirely in the zones of the Adriatic-Ionian coastline and the tourism centers.

Taking all these factors into account, we believe that there is more need than ever before for urban planning and studies, especially for long-term visions, and present multi-year urban development perspective of Tirana and the tourist hubs, which if implemented and respected with strict conditions, will definitely have a positive impact on the economy of Albania. It is indeed a very difficult task to anticipate until 2050 about urban developments, but this task is crucial for urban planners (architects, urban experts, researchers, etc.). We realize that we are lacking on some areas due to being deprived of accurate data often not available officially, and as much as we can do and would like to do, we aim to deconstruct the urban phenomena in the most realistic manner possible.

What is worrying, however, is the lack of any visionary studies for the long-term development of Tirana being a case in point. Not only is Tirana an emblematic model of short-term political decision making, it mirrors large trends and developments in the built structure of large urban areas, their ecological impact and process of environmental pollution. Today, the preservation of the natural environment is establishing itself as one of the most urgent global issues of our times, and it comes with important consequences for urbanisation and the preservation of the habitats.

Although there are environmental agencies and NGOs in Albania, there's still the glaring lack of state institutions that can take some real action and invest in the environment, and there's still the glaring lack of a real vision to deal with this issue that's global. We need to work together and start thinking together. As such, by concentrating efforts and unified decision-making, we can tackle environmental challenges and chart a sustainable future of our cities and our ecosystems.

The negligence and inaction seen in all environmental issues, especially along the coast, demand visionary approaches especially to Coastal Buildings Visions. It's saddening, up to date, that a unified sewage along the coastline has never been linked. Past and current environmental problems have continued to exist.

Most recently and most poignantly, approval of the construction of the Skavice Hydropow-

er Plant (HEC) was granted by the government. This took place despite the wishes of the residents of the region in the Peshkopia district in Kosovo, and despite their request for a referendum on the issue. The referendum was later rejected in early 2019 by the Constitutional Court. Building large dams in natural water flows has now become an approach rejected by scientific consensus and by most countries, and increasingly rejected because of its severe environmental impact. Building the future on top of a half-destroyed history is unsustainable. The new model would need to address more than the massive depopulation that is evident today, and its accompanying forced displacement, but also would need to protect the cultural, social and personal heritage that carries the DNA of these people. Respecting such heritages is not the same as defining and interpreting these through statistical 'facts per thousand'. We must recognize the living spiritual and sociological dimensions that exist in these communities.

Our massive unskilled emigration to Europe today presents an even bigger dilemma and marks deep contradiction for the Albanian state. Albania has aimed at a rapid and comprehensive economic development, in the absence of abundant energy resources. Now, the circumstances warrant a change, and the government must acknowledge this, and it must develop a more nuanced and balanced development vision. As are the many manifestations of the newly emerging global consensus. This change in thinking requires a paradigm shift towards a more sustainable and forward-looking approach, which rests upon four important pillars

Utilization of Alternative Energy Sources- We need to continue to adopt renewable energy solutions, which can both reduce the dependency on non-renewable sources and minimize pollution resulting from the actual production of energy.

Preservation of Natural Environments- We need to save our natural ecosystems for continued human life on Earth. This means maintaining biodiversity, preserving biomes, and reversing deforestation and habitat degradation.

Protection of Human Habitats- In light of modern awareness of the interdependency between human settlements and the natural environment, it is now of great urgency to serve in shielding communities from intrusive interventions, depopulation pressures and negative impacts of urban agglomeration, and to facilitate sustainable and adaptive urban planning oriented towards resiliency and inclusivity.

Responsible Urban Replanning- Urban planning has to be reflective of environmental stewardship. If we integrate environmental sustainability with the blueprint of residential constructions, we could effectively turn our homes into self-regulated ecosystems that are low on ecological footprints and high on quality of life.

Given these visionary mandates, the approval of projects that run counter to this spirit – like the construction of HPPs based on outdated, environmentally damaging modalities that negatively affect local ecosystems and displace communities – becomes unacceptable. It is counter to the general trend of sustainable development. This illustrates the fluid nature of Vision and Imagination, and how they require ongoing adjustment and fine-tuning the requirement to continually respond to a changing social context, advances in technology, and environmental necessities. Visions must continue to grow as humanity grows, so we can develop a more sustainable and equitable future.

Revisiting Durrës, a critical analysis on the existence of the historic centre of Durrës

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DOI: 10.37199/c41000704

Abstract

Durrës, a seacoast city with an uninterrupted urban life and a history spanning several millennia, has seen the influence of numerous civilizations, from the Illyrians, Greeks and Romans to the Byzantines, Venetians and Ottomans, embodying and displaying a rich inventory of archaeological, cultural and architectural heritage.

Its consistent strategic importance has continuously attracted urban development often negatively impacting layers of history and unfortunately erasing in many cases significant tangible archaeological and architectural testimonies from different periods. It is worth noting that the historic layers of 20th century including neoclassical, premodern and communist architecture is one of the layers that is mostly unstudied and generally underrated. Triggered by the fact that the underground of Durrës was one of the three first Albanian urban ensembles designated as “Museum City” since 1961 and that there was a specific regulation drawn for the protection of the historic centre since 1986, the question remains: what constitutes now the historic centre of Durrës?

In attempting to respond to this question, this paper examines the city’s morphological evolution in both urban and architectural scale, aiming to define what can now be defined as the historic core of the city. The study adopts the Historic Urban Landscape approach, promoting a holistic understanding of the heritage urban layers and their significance.

Keywords: *Archaeological Heritage / Durrës Historic Centre / Historic Urban Landscape / Urban Morphology*

Introduction

Durrës is an Adriatic seacoast city destined to be a gateway between east and west. From a physical-geographical standpoint, Durrës is situated in the western lowlands, on a flat alluvial plain between the Erzeni and the Ishmi rivers, and from the inside, it is surrounded by a hill slope. Most of the territory is a plain shaped by the reclaim of the Durrës swamp in the last century¹. Rich in both water and fertile lands, the territory was considered as very favorable for settling since antiquity. With a rich and uninterrupted urban history spanning several millennia, Durrës has been the crossroad of numerous civilizations, from the Illyrians, Greeks and Romans to the Byzantines, Slavs, Normans, Venetians, Ottomans and Europeans, embodying and displaying a rich inventory of archaeological, cultural and architectural heritage. Starting from its first official designation in 1961 as a “Museum City” it is considered as one of the most significant protected historic, cultural and archaeological heritage sites in Albania.

Its consistent strategic importance has continuously attracted urban development often negatively impacting layers of history and unfortunately erasing in many cases significant tangible archaeological and architectural testimonies coming from different historic periods. Thus, in the last 25 years, the historic urban landscape has been deeply modified and transformed due to the construction of highrise buildings which have negatively impacted both archaeology, and historic core as well as the vistas from the hills of the city to the sea and vice-versa, and visual corridors in / from

its fortification walls.

The “Old part and the underground of Durrës” was one of the four first Albanian urban ensembles designated as “Museum City” in 1961 and that there was a specific regulation drawn for the protection of the Historic Centre since 1986. Triggered by this fact the questions raised by this study are: “Can we talk today about a historic centre in Durrës”? If “Yes” - What constitutes now the historic centre of Durrës?

This paper’s discussion focuses on the fact that with time the historic urban and architectural features of the living built environment above the ground have been underrated and unvaluated. Due to this fact their reference in the designation documents has diminished through the years, favoring more the archaeological values which are in large part destroyed by uncontrolled high rise developments but also in large part still unearthed and unknown.

The study aims to promote a holistic understanding of the heritage urban layers and their significance. In order to display this holistic view of the historic urban landscape of Durrës, it firstly analyses all the historic layers of the city referring to main historic periods that have left their mark in the city. It further lists different legal documents that starting from 1961 have aimed the protection and preservation of the historic urban and archaeological values highlighting the fact that the term “historic centre” is not mentioned in the most recent designation documents. Lastly it examines the city’s morphological evolution in both urban and architectural scale, aiming to define what can now be defined as the historic urban core of the city.

Historic background of the development phases of Durrës

Protourban and Urban

The territory of Durrës is believed to have been inhabited since the Paleolithic². Casual archaeological findings such as work tools, jewellery etc. support this. However little evidence is yet found related to exact location of settlements from this period and the later ones Bronze and Iron Age (IX-VIII centuries BC). In many sources, the establishment of the city is referred as linked with the establishment of a greek colony in the 7th century BCE, however the preexistence of local settlements (Illyrian) is also mentioned and proven by archaeological evidence and ancient written sources³. The establishment of a greek colony mentioned in ancient sources as Epidamnos or Dyrrachion dates back to the 7th century BC, evidence of the intensification of the connections between the Greeks and the Illyrians of the Taulants tribe, who lived in this region⁴. In fact this cooperation resulted in a significant territorial expansion and economic development of the settlement. Among many motives leading to the establishment of Epidamnos / Dyrrachion as a greek colony, the most important ones were the need to control the trade routes to the Northern Adriatic, the inner territorial routes through the Illyria as well as the need to control the maritime intensive trade routes between Apulia and the Illyrian coast

Roman

Political and cultural influences that took place during the 4th and 3rd centuries BC in Epidamnos/Dyrrachion, aimed at raising its potential and domination in the Adriatic area. These influences are felt from all four sides: respectively from the two founding cities, Corinth and Korçyra, the Illyrian kingdom, the cultural influence of the Macedonian kingdom and from the approach of the Roman power to the Adriatic. At the end of the 3rd century BC, as a response to the call for

¹Theodoulidis N et al. 2022

²Based on Hidri H and Hidri S. (2014), the earliest evidences date back to the Eneolithic (2500 – 2000 BCE), continuing during the Bronze age (2100 – 1200 BCE) and intensifying after 1200 BCE during the Iron age having the highest peak during VI-V BCE.

³Hidri, H., Hidri, S (2014)

⁴Ancient sources (Strabo, Livy, Appian, Pausanias; Stephen of Byzantium) attribute two names to this city: Epidamnos and Dyrrachion and explain several mythological legends for this ambiguity: Archaeologists and historians still argue on the meaning of the existence of two names. Santoro (2004) supports the theory that one of the names refers to three pre-colonial Illyrian center located on the hill (so far it has not been found yet) and the other name to the Greek colony.

help of the locals, Dyrrachion became a military base of the Roman army during military operations against Queen Teuta's fleet⁵.

Hidri (2014) highlights that what the Roman Durrachium inherited from the Illyrian and Hellenistic Durrachium, was a city constructed according to the Hypodamus grid system. However a new urban system that highlighted the formation of insulae in line with the topography of the territory was applied during the Roman period. According to (Kacani, 2023) the main routes of the Roman Castrum respectively *Cardo*, coincides with today's "Aleksandër Goga" street, and *Decumano* coincides with today's "Adria" street.

Citing the works of the ancient Latin writers⁶, Santoro (2004), notes that they speak of a cosmopolitan city, commercial, powerful, attractive and active in the ports of the Mediterranean. The construction of the Egnatia road connecting Dyrrachium with Thessaloniki and the latter with Constantinople, triggered the further flourishing and economic development of the city. The road that connected Rome to the East was restored under the rule of the emperor Trajan. During this period, magnificent public buildings and structures such as the aqueduct, the amphitheater, the public baths and the library, which has not yet been discovered, were built. The Roman city was surrounded by walls, but in fact they had more of a symbolic role than a protective one.

Byzantine

During the 7th century Dyrrachion was a very important Byzantine fortress in the Balkans. Durrës particularly flourished during the reign of emperors Anastas I and Justinian. It should be noted that the today's fortification walls were constructed in bricks and thick layers of mortar are attributed to Emperor Anastas I (491-518), whose origin was from the city of Durrës. The fortifications of the time of Anastas I surrounded an area of about 120 ha reinforced by polygonal towers. During the 7th-12th centuries Durrës remained a major episcopal center; during this period the diocese of the city was very large and its bishops had a great influence. In the Byzantine chronicles of the 8th-9th centuries the region of Durres is mentioned as one of the largest and most important regions of the Adriatic coast, as the main base of the Byzantine military fleet and the central place of the commander of this fleet. During the VII and VIII centuries the city had direct contacts with Constantinople and Thessaloniki, but also with other important Byzantine cities. Until the end of the 10th century Durrës remained an important episcopal center. During the years 813-826, a monastery was also built in the city. Kacani 2023 notes that during this period the city is monocentric, with the administrative religious and commercial in the center. Although following the same morphological pattern of the ancient settlement, the orthogonal system of the Roman Empire, with the demographic growth and the alterations, this infrastructure was rather altered, but traces remained.

The excavations led by Santoro during 2001-2002 have brought to light walls from the Hellenistic, Roman and Byzantine periods. Fig.1 below shows the areas with concentration of archaeological findings from the different historic periods.

Venetian and Ottoman

During 1272-1285, Charles I of Anjou created the Monarchy of Arbëria with its center in Durrës and he called himself King of Albania (*Regnum Albaniae*), another testimony of the significance of the city. In the following centuries it was the Venetians who replaced the Angevins as the dominants of the city until 1502 when the city was conquered by the Ottomans. The Venetians and

⁵Santoro S. (2004)

⁶Santoro 2004 mentions Plauto in the comedy *Manacmi v. 258-264 Catulomus 36,15*, Santoro 2004. She also mentions other writers confirming the attractiveness of Durrachium such as Cicero and *Epistula*.

⁷Santoro S. (2004)

⁸Hidri et al (2014), pp.335-336

⁹Hidri et al (2014) pp.338 notes that the author of the urban plan was Luigi Luiggi and the implementation was undertaken by Mazzorana Association under the direction of General Tito Consigli.



Fig. 1/ Map of Durrës showing areas with concentrations of archaeological findings based on respective historic periods, data source from the ARS Progetti S.P.A (2022), drawing from Buka I, 2024

Ottomans partially rebuilt the Byzantine fortification walls and the citadel in the center of the city. Following the Ottoman occupation, the economic relations with the rest of the Mediterranean were interrupted and as a result, the city lost its commercial importance. During the Ottoman rule, the inhabited settlement shrank becoming very limited in area and the number of inhabitants significantly diminished compared to the previous Roman and Byzantine periods⁷. It was during the 17th century that the city started slowly to regain its role as a commercial centre⁸.

Early 20th century

In 1923 Durrës numbered 4,785 inhabitants, a number which increased drastically in a period of 15 years (1938) when it numbered 10,506 inhabitants. This constituted a proof of the economic development experienced by the city in the early 20th century. The port of Durrës regained its role as a main port enabling and fostering the economic relations between Albania and the Europe Works for the enlargement of the port and the drying of the swamp were implemented during 1927-1929⁹.

During the 1920-1930 Durrës started to gain the look of the well -organized cities due to several urban planning studies and projects. The urban development plan of the city as designed in 1926 and its implementation was completed in 1936¹⁰. Among many works and constructions also the “Commercial Street” has been enlarged and revitalized with constructions of 2-3 floor buildings having shops at ground floor that today returned as pedestrian area and named as “Epidamn boulevard”, constitutes as one of the remaining ensembles related to this period.

Natural disasters and the city layers

Durrës and the surrounding region were hit by strong earthquakes ($M > 6.0$), in the past. The ancient city of Durrës (Dyrrachium) has been nearly destroyed by several devastating historical earthquakes in 58 BC, 334 AD, 346 AD, 506 AD 521, 1273, 1870, and 1926, because of which in several cases the abandonment of Durrës is also recorded¹¹.

¹⁰Theodoulidis N et al. 2022

¹¹Santoro S. 2008 p.10

¹²(source Buka I, Plyku Demaj M., 2024)

¹³Decision of Council of Ministers No.172, dt. 02.06.1961 “On the Proclamation of Museum Cities”

¹⁴Buka I.,Plyku Demaj M. (2024)



Fig. 2/ Diagrams showing the tendency of settlement gravitational zones based on archaeological findings (from left to right (1) showing the transition from Hellenistic to Roman settlement, (2) showing the Roman-Byzantine gravitational zones, (3) showing shrinking of the city during Ottoman period. Data source from the ARS Progetti S.P.A (2022), and Kacani 2023, interpretation and graphic representation from Buka I, 2024

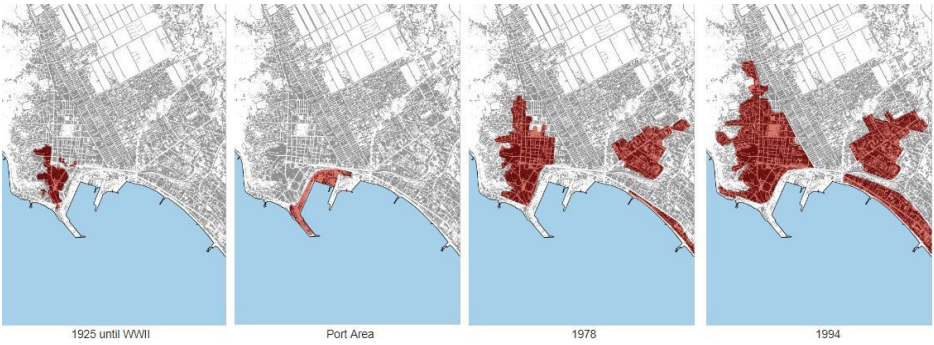


Fig. 3/ Diagrams showing the urban sprawl during 1925 - 1994. Data source from the ARS Progetti S.P.A (2022), and Kacani 2023, graphic representation from Buka I, 2024



Fig. 4/ Epidamn boulevard during 1926, 1980 and today¹⁶

¹⁵ Monument: an instrument of memory. See: 2023, Jorge Otero-Pailos, *Historic Preservation Theory, An Anthology*. Reading: Françoise Choay, *Seven Propositions on the concept of authenticity and its use in historical practices*. (proposition 4, pg. 481)

¹⁶ (source Buka I, Plyku Demaj M., 2024)

¹⁷ Decision of Council of Ministers No.172, dt. 02.06.1961 "On the Proclamation of Museum Cities"

¹⁸ The regulation was developed only in 1989.

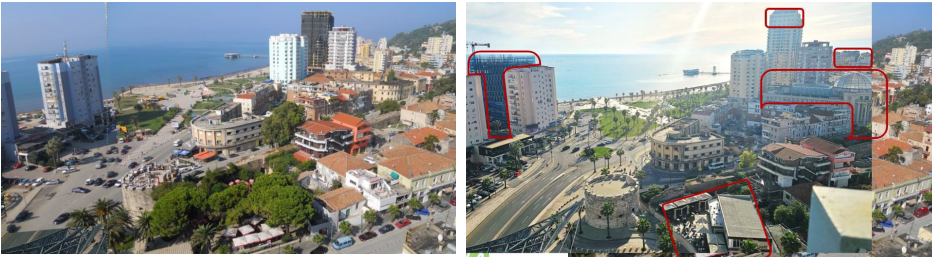


Fig. 5/ Vista of the city looking towards the venetian tower from one of the fortification towers highlighting in red the negative impacts of new high-rise buildings development (Angevin tower) photos dating back in 2010 (source Marsela Plyku Demaj) and in 2024 (source Iden Buka)

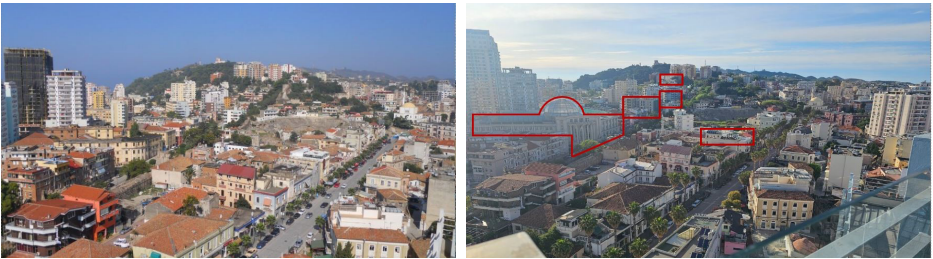


Fig. 6/ Vista of the city looking towards the Epidamn boulevard from one of the fortification towers highlighting in red the negative impacts of new high-rise buildings development (Angevin tower) photos dating back in 2010 (source Marsela Plyku Demaj) and in 2024 (source Iden Buka)

According to ancient sources Dyrrachium suffered serious damage in the earthquake of 346, known as the “Durrës earthquake”. That date marks a turning point and profound moment for the urban transformation of the city: its role strategic became increasingly accentuated in the framework of relations between East and West, forcing a its reconstruction with a notable change of urban structure, compared to what one can imagine of the previous urban form. This change does not appear to affect the road network or the fortification system, or the hydraulic and sewage system, which are substantially kept active or repurposed, but the hierarchy of spaces within the city¹². In 1926, due to a devastating earthquake, a large number of houses, mostly built in adobe, within the Castle district were damaged. This disastrous event paved the way for the ambitious and modern project for the construction of the city’s new boulevard¹³ and to several regeneration interventions. It was during this pre-war period that the boulevard displayed its strongest character, when planning mechanisms, architectural projects activity and the functional aspect acted together towards the forming of the “Commercial street” as an urban unit. Buka et al (2024) stress that the boulevard is one of the permanent urban elements in the city. It can be said that the current character of the boulevard derives from the atmosphere of the early 20th century.¹⁴

The peculiar case of Durrës as a cross road of many civilizations and also as a site experiencing numerous disasters made possible the creation of different layers of the city juxtaposed one over the other. Santoro (2004) notes that the Roman city today is located below the current center of today’s city, at a depth of about 3-5 m. Below the roman layer the earlier illyrian and hellenistic cultural layers are found and above it the byzantine, venetian and ottoman cultural layers are found.

¹⁹Regulation dt.17.04.1989 “On the protection, restoration and administration of the underground of the city of Durrës”On the approval of the regulation for the administration of archaeological zones A and B of the city of Durrës.

²⁰ Decision of Council of Ministers No.6, dt 7.1.2005 “On the approval of the archaeological zones within the urban settlements Shkodër, Lezhë, Krujë, Durrës, Elbasan, Berat, Vlorë, Sarandë”

²¹Decision of Council of Ministers No. 237, dt. 23.033. 2011 “On

Date and Legal document	Zoning / Authority / Allowed interventions
1961 ¹⁷	Museum-City - «The Old Part and the Underground of Durrës» University of Tirana is in charge for developing the regulation within 1962 ¹⁸ , noting that until the specific regulation is developed, the regulation to be followed is that of Berat and specific dispositions of Tirana Univesity
1989 ¹⁹	Zone A – not dense 1-2 stories buildings. Higher buildings allowed in rare cases if no archaeological assets are priory verified Zone B - Buffer zone - New constructions allowed after archaeological testing Zone C - in observation for possible findings in the underground / New construction allowed
2005 ²⁰	Same as the zoning of 1989
2011 ²¹	The Ministry of Culture with its subordinate institutions is the main authority / The National Council for Tangible Cultural Heritage has a key role / The local government is responsible for building permissions in Zone B Zone A - Integrated maintenance, restoration and conservation / road reconstruction and all works in the engineering network reconstruction/rebuilding of existing buildings without changes to the footprint / Light constructions – max. height of one story, for public information Zone B - More flexible, New construction is authorized after validation by the National Council for Tangible Cultural Heritage
2018 ²²	Zone A - integrated maintenance, restoration and conservation / road reconstruction and all works in the engineering network / reconstruction/rebuilding of existing buildings without changes to the footprint / Light constructions – max. height of one story, for public information Zone B - more flexible thus New construction is authorized after validation by the National Council for Tangible Cultural Heritage

Table 1 / Chronology of the designations of the historic and cultural values of the city

The preservation of this historic layering is often put in risk or even jeopardized in today's situation when the city is experiencing a rapid and uncontrolled development in terms of continuous constructions. Often the construction of new high-rise buildings has destroyed ancient underlying structures underground often equipped with floor mosaics.

Literature Review

While researching on the potential values as historic urban ensemble in Durrës, it is necessary to draw on the concepts of historic monument and authenticity. Choay 2023 argues against the generic use of the term 'heritage,' which can dilute the specific attributes that define a historic monument. Believing in an holistic approach, she considers that authenticity is crucial for maintaining the cultural significance of historic structures and areas, as it reflects their historical and artistic value. Also, she emphasizes the importance of recognizing the unique characteristics of cultural heritage. She posits that authentic monuments serve as vital markers of identity, contributing to the collective memory of societies.¹⁵

²²Decision of Council of Ministers No. 786, dt. 26.12.2018 on the approval of archaeological zones "A" and "B," of the city Durres and the plan for their preservation, protection, and administration.

²³ Decision of Council of Ministers No.831, dt 28.12.2023 "On the approval of the management plan for the archaeological zones A and B of the city of Durrës, 2023–2030"

²⁴The course is part of the program Executive Master on Restoration, Conservation and Valorization of Cultural Heritage, 3rd level program provided in a Joint program between Polis University and University of Ferrara.

Looking at the history of preservation Koolhaas 2004, reflects that the history of preservation in terms of what was being preserved, has gradually expanded from its start with ancient monuments, then religious buildings, etc. towards including more and more sociological substance considering that now everything we inhabit is potentially susceptible to preservation escalating to include entire landscapes. This reflection is particularly important to understand that preservation is not about quantity of preserved areas and buildings. It should be a qualitative assessment of values and authenticity to drive the preservation assessments.

Methodology

The methodology for this study on the historic layers of the city employs a dual-scale approach, focusing on both urban and architectural dimensions to delineate the city's historic core. At the urban scale, the analysis utilizes a comparative method by comparing urban vistas based on aerial photographs from 2007 with today's situation, allowing for an examination of changes in city layout and building volumes over time. Additionally, historical city plans from various periods are layered to identify spatial transformations, providing insights into the evolution of urban layout. At the architectural scale, the research draws on prior studies conducted by the authors, which document the characteristics of 20th-century architecture within the city. This framework not only highlights the architectural features that define the era but also situates them within the broader context of the city's historical narrative. By integrating these methodologies, the study aims to foster a holistic understanding of the heritage urban layers and their significance, contributing to a more nuanced appreciation of the city's morphological evolution.

Analysis and discussion

Based on the literature review and data on the archaeological findings from different historic periods an interpretation of the tendency of settlement gravitational zones is developed in Fig.2. Analysis shows that even though the findings from different periods are found in a larger territory, the area of the Ottoman citadel is the area where all urban layers can be found. Fig. 3 showing the urban sprawl of the city, is an evidence of the economic development but also an evidence of the development pressure felt in the archaeological areas and larger territory. The analysis developed above as well as previous research such as Buka et al (2024) and Çapeli et al (2016) show the existence of several permanent features in the urban layout and architectural characteristics featuring early 20th century interventions. Çapeli et al (2016) notes that the buildings built along the "Commercial Street" create a nice corridor street atmosphere. Some of these are in a Neo-Classical or Eclectic style (built before 1926), but others reflect a modern architecture clearly influenced by the principles of Italian rationalism (built after 1926). Figures 5 and 6 below show the negative impacts of continuous urban development on layers of history. Clearly the general vistas of the city reflect the introduction of high rise buildings in the city center and in the sea coast forming a wall between the sea and the historic urban neighborhoods. The chronology of the official designations of the archaeological and historic urban area of Durrës is presented in Table 1 below. It is clear that even though the protection of both the historic urban area and archaeological area were in focus of legal protections (see designations of 1961, 1989 up to 2005, in following 2011 and 2018 designations focus was given only to the archaeological zoning not mentioning the upper historic urban layer, which was limited only to occasional protection of buildings designating them as cultural monuments.

Results and recommendations

The most evident result shown by the research is that the layer of 20th-century architecture in Durrës including the layers before and after the World War II are understudied and underrated. Another important result, also previously noted by Buka et al. 2024, is that the vernacular, pre-modern and communist architecture somehow coexisted harmoniously together, still displaying their distinct character. In contrary, the post 90s and still continuing today did not succeed to define

a contemporary unifying character and in some cases has failed to understand and recognize the significance and relationships of elements from different periods in the historic neighborhoods.

The numerous written data and information on Durrës archaeological area being both scientific and informative mediatic, shows the high level of awareness that the professionals and citizens have with respect to the everyday loss of the rich archaeological heritage caused by the economic interest and speculations of investors in building high-rise buildings in archaeological designated zones. An overarching recommendation to this fact should be the transparency of decision making in issues related to urban development allowing the community engagement and empower which is crucial to protect and maintain their heritage.

Several recommendations can be drawn from this research that can inform decision making structures when dealing with projects at either urban or architectural level at historic urban areas.

Designation as historic urban ensemble and development of a Preservation Guide at urban and architectural level

A more holistic approach towards the preservation of cultural heritage values is recommended. The areas with a significant concentration of early 20th century (Epidamn Boulevard and the central piazza) buildings together with the single monuments dating from ancient, byzantine, venetian, ottoman etc. should be considered as potential areas to be designated as a historic urban ensemble. The early 20th century layer should be valued, studied and preserved. This proposal is also in line with the recommendations provided in the 2018 integrated management plan. The development of a preservation guide for this proposed ensemble is necessary in order to inform local government structures, professionals and local community on the understudied and under-rated layers of 20th-century architecture in Durrës, highlighting the importance of understanding and preserving these layers.

This guide should be an indicative and non-binding document aiming the preservation of the technical elements and architectural features of the buildings (roofing, facades geometry, etc.) and the urban identity of neighbourhoods. Its application must be made in accordance with the planning documents of higher importance, urban planning, and master plan.

The vistas / view points and historic visual relations should be taken into consideration prior to approval of further constructions that might further negatively impact on this visual corridors. As many researchers dealing with Durrës have stressed, a final recommendation that the authors of this research strongly support is that only careful urban planning, taking into account the existence of an “underground museum”, can contribute to the preservation of an incalculable and invaluable heritage.

Acknowledgements

This research was initiated by Iden Buka as an assignment on the historic overview of the urban settlement of Durrës in the framework of the course Theory of Restoration / on Archaeology class directed by Dr. Ols Lafa²⁴. Starting from this basis, the authors of this paper were inspired to further proceed on refining the research topic and developing and completing the analysis presented in this research.

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02- Social Sustainability

This subtheme addresses the social dimensions of urban sustainability. It investigates how social equity, inclusivity, and community engagement can be fostered in urban settings to ensure a sustainable and resilient future.

Readdressing Urbanization and Migration in Albania circa 1990: a novel approach.

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DOI: 10.37199/c41000705

Abstract

The phenomenon of illegal construction has attracted a considerable volume of research, in the fields of theory, policy making, practice and implementations. The dysfunctionality of laws, corruption and clientelism of the administration, the impunity of the law breakers, and the inability of the planning system to provide adequate housing and land uses suitable for development, were considered as the main reasons for illegal construction. Consequently, there was a general assumption that illegal construction was mainly met in developing countries. This was proved inaccurate in recent years, where research has shown that developed (or Global North) countries were also experiencing this phenomenon -and in fact, they always had. An interesting approach to this, was the investigation of cases where legal and constitutional frameworks were also imperfect, and enforcement mechanisms were not serving social justice. This was a diversion of the axiomatic rule that laws should always be obeyed, while, at the same time, there was an assertion that in some cases noncompliance should be regarded as justifiable. The proposed presentation will refer to cases of noncompliance, as described above, but will focus on another dimension of the phenomenon, frequently met in real life situations, but seldom considered as an issue worth scientific research. This aspect deals with the innovation element frequently employed by actors trying to circumvent the existing laws and rules in planning implementations. The degree of innovation invested in the illegal operations, usually transforms the particular action from “breaking the law” to “bending the law”. Researching the innovation element in cases of illegal construction is particularly useful for lawmakers, law enforcers and theoreticians. By analysing these innovative actions, lawmakers can identify the loopholes and deadlocks of legislation which appear in specific cases and under specific conditions and correct them before they provoke generalized judicial complications. Law enforcers can detect weak points in grossly under-researched enforcement functions and improve the related organization processes. Finally, innovation in illegality in the sector of planning implementations can enlighten the researchers in exploring the weak points of planning systems, identify cultural elements in social behaviours -for which the type of innovations described above has encapsulated a high exploratory value- and inject a very much needed sense of humour in the scientific research.

Keywords: Migration, urbanization, demographic indicators, population census

Introduction

Migration¹ has been characterized as Albania's most popular livelihood strategy, and a way out to deal with unemployment and other income challenges related to the shift to a market economy, after the fall of the command economy, in the early 1990s. The study of Albanian migrations is well-couched in the 'privileged' relationship between migration and poverty (Kokkali, 2024: 272). However, as it has been argued elsewhere (op. cit.), the prevalence of this perspective in a large strand of research, which is also very influential, seems to allow only for a partial understanding of the Albanian migrations, providing inadequate explanation about the persistence and massive-

ness of the outflows for the last thirty years (op. cit.). Meanwhile, it is well known that the internal migration movements during this period have been a major factor of extensive urbanization, while bringing in a drastic reduction of population in many places and/or regions in Albania. The research activity dealing with urbanization in Albania after the 2000s is growing rapidly, seeking to assess this intensive phenomenon, in particular as regards the urbanisation and sub-urbanisation of the greater area of Tirana, and the axis Tirana-Durres. Yet, it is interesting that, to date, this research body has paid limited attention to the study of the country's urban development before 1990: there seems to be a dominant perception which 'inaudibly' equates the fall of the regime with a rural exodus, thus considering that zero point of urbanization in Albania is situated circa 1990. Against this background, in the present paper, we wish to look more carefully into the territorial development of Albania before 1990, while questioning whether this development might present any correlation with the directionality of contemporary Albanian migrations, internal and international. Starting our reflection by this question, we point to that the doctrine of the universal control of the movements of Albanian citizens from 1960 to 1990, signaled the control of the urbanization processes in socialist Albania; yet, at the same time, this fact – combined with other policies of spatial and economic development that have been implemented by the communist regime – nourished a peculiar type of urban/territorial organization, which was apparently not trivial and it might have also been underestimated in the statistics of the time (possibly for ideological reasons). It is not without relevance that, according to research conducted in the 1980s, this socio-spatial organization was not portrayed in the statistics of the time (Carrière & Sivignon 1982). This is key to our understanding of the 'urban' situation in Albania circa 1990. And, we believe that it is also key afterwards, during the transition period, that is a period of tremendous socio-political, population/demographic, economic and other changes. In this line, our purpose here is double: (i) to shed light on the urban/territorial development of Albania earlier to 1990, which remains relatively unknown and an underestimated phenomenon in current research; and (ii) to provide some insight on the relation (if any) of that territorial development to the patterns of internal migration before 1990. We are highly interested in investigating this potential correlation, which will provide a new perspective on the study of the Albanian migrations post-1990. To date, these latter have been mainly considered through the scheme poverty-rurality. This is why, in the following section, we briefly summarize the main findings of this seminal body of research.

The Nexus Poverty -Migration in the Albanian Context²

According to an absolute poverty line calculated by the Albanian Institute for Statistics (IN-STAT), in 2002, the 'poor' made up one quarter of the Albanian population (World Bank & INSTAT, 2003), with 30% of the rural population to live below the poverty line, while the respective ratio for the urban population was about 20%. There is a common view among researchers (see Zezza et al., 2005: 176–177) that poverty in Albania, during the 2000s, was higher and deeper in rural areas when compared with urban areas. It was also found to be disproportionately concentrated in the mountainous areas of the north-east: 46% of the country's poor were concentrated there, while the population of these regions accounted only for 12% of the country's total population. Correspondingly, only 8% of the country's poor resided in Tirana. When measuring the Headcount poverty ratio, that is the number of poor people to the total population (in %), the mountainous north-eastern region registered a headcount of about 45%,

¹ It has been estimated that, by the end of the decade 1990, approximately 800,000 Albanian citizens were living abroad. In the early 2000s, approximately 25% of the total population (or over 35% of the workforce) had emigrated abroad. In 2017, about half of the country's population was missing due to international migration. Compared to 1990, the current size of the resident population stock at the national level has been decreased by about 12% due to emigration, followed by a decrease in the birth rate for about 65% and an increase in the death rate for about 20%. See also, summary table in the Annex.

² This section relies heavily on Kokkali (2024: 273-286).

against 26% for the Central and 21% for the Coastal regions. In Tirana, the ratio was of 18%. Kotzamanis, Duquenne, Pappas and Kaklamani (2003) found a correlation of poverty with rurality: they showed that the most favoured group in terms of non-income poverty profile was located in the two regions with the highest urban population rate, Tirana and Durres. On the contrary, the highest degree of non-income poverty was mainly found in the mountainous areas, such as the eastern regions of Albania (Kukes Diber, Bulqize, Librazhda), which also had a high degree of rurality. Similarly, the north of Albania overall presented a relatively negative situation in terms of non-income poverty (very negative profile), with the exception of the counties of Shkodër and Tropoje, which were found to be in a more favourable position. According to the authors (op. cit.), the mountainous character of these two counties has not been decisive for the level of poverty. This has been associated to that most villages and settlements were concentrated mainly around their administrative centre, and, also, to the fact that Shkodër was the 4th largest urban centre in Albania. The high degree of urbanity of the county of Shkodër – due to the city of Shkodër – was, therefore, associated with a better picture of non-income poverty across the whole county. This is probably not irrelevant to the fact that Shkodër was historically one of the most important urban centers of Albania. More precisely, Shkodër was the most important Albanian city at the beginning of the 20th century and until the making of the Albanian capital – Tirana – in the 1930s. Shkodër was the most populated city and presented the highest degree of urbanity (100%) within the Albanian territory until 1926, when started its tremendous decline in the urban hierarchy. In 2011, it only presented $\frac{1}{4}$ (25%) of the population of the most populated Albanian city, i.e. Tirana (Jarne, 2020: 321-322). Strong regional disparities in terms of income and non-income poverty have been observed in connection to internal and international migration as well (see Carletto et al. 2004; Zezza et al., 2005). In a perspective that associates the patterns of migration with those of poverty in the Albanian context, it is widely admitted that, in the first decade of the transition to the market economy, two main trends were traced. A first move from the poorer, mountainous areas, located far from the gates of international migration: these areas, in the north-east of the country, tended to specialize in internal migration, thus creating a continuous flow of migrants to Tirana and other urban regional hubs. The second major move corresponds to the gates of international migration, namely the more dynamic—in terms of economy— coastal areas facing Italy (such as Shkodër, Durres, Tirana, and Vlorë), or those on the border with Greece (such as Korçë); these areas were massively attracting internal migrants, some of whom would probably end up feeding the large international flows heading to Greece and Italy. In summary, the mountainous districts of the north-east produced a steady flow of poor migrants to Tirana and other regional urban centers, while the least rural and poor districts of Tirana and Durrës were the main receptors of internal migration. Internal movements were also generated in some less poor—but very rural—districts in southern Albania (Berat, Korçë), toward nearby urban centers (Kokkali, 2024: 292). There has been, therefore, an obvious spatial differentiation of coastal areas from the hinterland, and an indisputable dominance of international destinations in the south of the country (towards Greece), as well as in the coastal regions (towards Italy, after crossing the Adriatic).

Focusing on the urban development of pre-capitalist Albania: A first approach

In the previous section, we have presented briefly the main findings of a very influential body of research on Albanian migration that related the degrees of rurality to internal and international migratory moves via the intermediate of poverty. As maintained elsewhere (Kokkali, 2023 & 2024), it is reductive to approach the critical developments to human mobility that took place in Albania over the last three decades only under the perspective offered by the – undeniable – linkages between poverty and migration. Other processes are also at work within the migratory process, and one of these concerns undeniably urbanization. However, while the study of urbanization

and sub-urbanization of Albania in the last three decades excites the interest of researchers, thus producing a considerable body of work, less attention is paid to the state of Albania's urban/territorial development before the end of the imposed ban on mobility, either internal or international. The image of the urban/territorial development in Albania is quite complex, and not at all linear. In summary, the development of Tirana before 1960, the "imposed" stagnation of the communist period (with growth lower than that of the country), and finally the recovery – after 1990 – of the post-war trend of urban growth, are spectacular. New cities were developed during the period of industrialization, especially the 1950s. Then they developed at the expense of the development of Tirana, but their growth was only slightly higher than the growth of the Albanian population in general. In 1960, there is a major shift in the urbanization of Albania. The "cultural revolution" of the country triggered inter alia a set of anti-urban policies that sought to abolish urban-upon-rural domination. This mainly meant to maintain a numerical balance between the "urban" and the "rural" populations. In this context, although urban growth rates remained high, they were only associated with a very high birth rate, while only small new towns ("exemplary" cities) continued to benefit from some migratory influx (Jarne, 2018). In all the others in-migration was prohibited. Since 1991, Tirana and its suburbs have been growing in a spectacular way. On the contrary, the network of the so-called "exemplary" cities gradually collapsed after 1991, as lifting the travel ban worked mainly to the benefit of the Tirana-Durres metropolitan area. It is to note that some cities initially resisted the decline, since emigration to Tirana and abroad was offset by intra-regional influxes of rural population; still, since the 2000s, all these cities have lost population, with the exception of Saranda, a coastal city, which was the only one to develop outside the Tirana-Durres metropolitan axis (Jarne, 2018). In summary, we can distinguish five major periods regarding the urbanization of modern Albania:

1. In the interwar period, Tirana, as the capital of the new Albanian state, acquired centrality and developed rapidly.
2. During the first 15 post-war years, we testimony a general –yet delayed– take-off of urbanization in Albania. Urban development in this period, associated with massive industrialisation, is particularly high in Tirana, and in the cities of the central plain (Elbasan, Durres, Fier and Vlorë).
3. The period from 1960 to 1991 is marked by the creation of new cities, but also by the severe restriction of the development of existing cities, in particular Tirana;
4. With the fall of the regime and the consequent liberalization of migration, there is a recovery of urbanization processes with the contribution of rural populations; these latter, through self-housing practices, settle in new "arbitrary" settlements in the suburbs (mainly of Tirana).
5. Since the mid-2000s, there has been the creation of large complexes in the suburbs, mainly in and around Tirana ("Tirana-Durres metropolitan area"), while other cities begin to decline (Szeleenyi, 1996; Hirt, 2013; Jarne, 2018).

At this point, it is worth looking closer at the territorial/ urban development of Albania during the period of "stagnation", and more precisely in the 1970s and 1980s. Geographer Michel Sivignon (1970; 1975; 1977; 1983) described an urban-residential network, which, apart from Tirana, consisted of:

1. medium-sized cities of the eastern valley,
2. two fast-growing ports (Durres and Vlorë),
3. old commercial cities, some of which were developing mildly (Korçë, Shkodër) and others were developing rapidly (Elbasan);
4. as well as (new) small settlements created for the concentration of farms or as mining and industrial centres (Sivignon 1975, Daniel 1978).
5. In 1983, Sivignon (1983: 41) observed that, thanks to this network of settlements, Albania was spreading non-agricultural work and employment, throughout its territory. Sivignon was wonder-

ing, besides, whether, in this way, Albania would manage to keep its population “immobilized” indefinitely even in the most isolated areas.

The network of settlements described by Michel Sivignon is, thus, about different population sizes, yet also about different economic-productive functions of the different settlements, villages, towns, cities, etc. that formed the network. To paraphrase Sivignon, while the Albanian population was kept in the countryside, classified in all probability as “rural”, we know that they were employed in non-agricultural work, performing economic activities related to the functions “assigned” to the city/ settlement, etc. of stay (mining industry, textile industry, etc.). This diffusion of non-agricultural work throughout the Albanian countryside before 1990, as described by Michel Sivignon and other researchers (Carrière & Sivignon, 1982; Borchert, 1975), is crucial for understanding the dynamics of urbanization in pre-capitalist Albania, as well as of the territorial development of the country. It is also crucial for understanding contemporary migration phenomena. Because, this image of the Albanian territory, as described by Sivignon and others, seems to challenge the division between urban/rural, contesting the respective boundaries, at least as we know them through the relevant statistical categories of population (“urban”, “rural”, etc.). Building upon these ideas, it is slightly disturbing to think that the explosive proportions of internal migration towards cities, and especially towards Tirana, after 1990, constitute the “thaw” of a rural exodus that was prevented until then. This mass exodus to the cities may resemble a rural exodus (Jarne, 2020), but, due to the lifestyle – including employment – of Albanian citizens around 1990 it cannot be characterized as such. Let us recall that, as early as the 1980s, Carrière & Sivignon (1982: 149, 153) referred to the urbanization of Albania as a phenomenon that was not statistically captured. That is, the characterizations/definitions of the population as “urban” or “rural” were far from what was observed in situ. These authors also wondered whether it was possible to industrialize the economy and urbanize society while keeping the population in the countryside, avoiding, therefore, its increasing concentration in the cities – a trend that had already begun to emerge after the war. This, in turn, sets some questions about the lifestyles performed in the settlements of this network, which seem to have been far from a purely rural/peasant way of life (op. cit.). In any case, both the retention of the population in the countryside (with the simultaneous urbanization of society), and the incomplete statistical depiction of Albania’s urban/territorial development (mainly through urban/rural population percentages), seem to obscure the image we have made so far of the state of urbanization in pre-capitalist Albania. There is, therefore, a need for further investigation of this issue, beyond the idea of an incomplete rural exodus. In this line, it is worth noting that Örjan Sjöberg (1992) pointed that Albania did not account for an example of “zero urban development”. Studying the case of Tirana, he suggested that the peri-urban settlements around the capital have experienced substantial growth due to unplanned in-migration. There was a significant urbanization pressure around Tirana, which was not merely on hold, as we normally assume when reporting the ban on movement in communist Albania. Sjöberg (1992: 14) pointed this by way of referring to the high numbers of commuters reported to set out daily for town from the surrounding countryside. To the concepts of “zero urban development” or “pseudo-urbanization” (Murray & Szelényi, 1984), Sjöberg contrasted, therefore, the concept of “diverted migration”, stressing that these in-migrants were primarily vying for an opportunity to settle in Tirana itself, with their current residence in the nearby rural settlements being a second-best alternative. In fact, via the concept of “diverted migration”, Sjöberg interpreted the development of a kind of suburbs around Tirana: migration between rural areas, which resulted in settling in agricultural cooperatives closer to the big cities of Albania (and in particular closer to Tirana), was subject to less control by the state, and this is why it took place. Said alternatively, the detour of urban in-migrants was based on rural–urban commuting, and the growth of peri-

urban settlements of substantial densities in the immediate vicinity of Tirana (Kokkali, 2024: 281). In spite all the above, and contrary to this line of reflexion, in the most recent literature, the control of migratory movements and of urban growth since 1960 has often been equated with the “freezing” of urbanization processes in favour of –implicitly or explicitly– an assumption of “zero” or, at least, negligible urban development. This assumption, reasonably, leads to a second: the explosive internal migration post-1990 is part of the process of a rapid rural exodus (see, for instance, inter alia, Lerch (2016), who examines the relationship between urbanization and international migration, observing, in the recent years, a partial redirection of the rural exodus abroad). All in all, research activity focusing on the recent – and admittedly explosive – dimensions of urbanization in Albania (which are apparently linked to the explosive dimensions of migration since 1990) seems to have bypassed the study of the country’s peculiar urban development under the Hoxha regime, often implying that the rural exodus of Albania was marked by the fall of the regime.

Discussion: Insights for the study of the Albanian migration in the light if pre-1990 urbanization in Albania

In this last section, let us redirect our attention to the study of the directionality of contemporary Albanian migrations, making a brief comment.

1. Taking for granted the nexus poverty-rurality, there has been a taxonomy of Albanian prefectures and regions according to their “specialization” in internal and/or international migration; but also, regarding their direction (from rural to other rural or urban areas, from mountainous to coastal regions, etc.).

2. This specialization concerns specific migration patterns (in terms of directionality).

3. Yet, this directionality of contemporary Albanian migrations has not been studied together with the patterns of previous internal movements, i.e. those that have been recorded after the war and until the fall of the regime. For instance, for the period 1965-1971, Borchert (1975), based on the calculation of natural balances per region for each year (given the zero international migration during the period under review), showed the existence of movements from peripheral areas to coastal plains, particularly at the expense of the south and eastern regions of the country. He made a map of internal movements and showed out-migration from the southern regions such as Gjirokaštër, Përmet, Vlorë, but also from the eastern regions (Librazhd, Dibër).

4. In recent research activity, our conclusions on the directionality of contemporary Albanian migrations were mainly determined by –and correlated with– the level of poverty/rurality of an area of out-migration, as recorded after 1990 (see previous sections), rather than with the inter-regional mobility of the Albanian citizens that has been recorded post-war and until 1990.

5. It is worth studying, however, whether similar migratory patterns emerge between previous and contemporary Albanian migratory movements. Because, after all, the systematic correlation of the directionality of Albanian migrations with the degree of rurality-and-poverty of an area of out-migration (be it internal or international) seems to focus on the obvious: namely, a predominantly rural population that migrates when and where it can.

As an alternative to this line of reasoning, our purpose here has been to bring in the foreground the study of the urbanization processes of the Albanian territory before 1990; and, also, to formulate some meaningful questions on the correlation of these processes (if any) with the directionality of contemporary Albanian migrations, so as to propose an alternative approach to the dominant for the study of these remarkable migrations (Kokkali, 2023). Building upon these ideas, we set some questions that will hopefully trigger a new approach to the study of the Albanian migration.

i) Is there any correlation between the directionality of contemporary Albanian migrations and the urban development of Albania before 1990, as shaped by the policies for spa-

tial and socioeconomic organization implemented under the communist regime? Considering that the doctrine of the universal control on movement in Albania, combined with other policies of spatial and economic development implemented by the regime, resulted in the control of urbanization processes, yet, while creating a peculiar type of urban/territorial organization, which was not statistically depicted; and, which, for this reason, deserves to be studied anew, in correlation both with current urbanization and migratory trends. ii) To what extent do migrations after 1990 show similarities in directionality with any internal movements tolerated by the regime in previous decades? Do common patterns emerge and, if so, what are the causes?

In conclusion, in this short paper, we have tried to provide some insight for a closer study of urbanization processes in pre-capitalist Albania, contesting inter alia an implicit –yet prevailing– assumption of “zero” or trivial urban development earlier to 1990. Stemming from the doctrine of the universal control of movements and the consequent control of urbanization processes in pre-capitalist Albania, this assumption usually sets the issue of post-1990 explosive migrations in terms of a “rural exodus”. This is not accurate, as we briefly discussed herein. We suggested that these issues, which remain largely unknown, need further and more systematic investigation, in order to lead to the formulation of new working hypotheses for the study of the migratory phenomena in Albania. This would enable the study of Albanian migrations to move away from the triptych rurality-poverty-migration, shedding light on the peculiar urban development of the country after WWII and until the fall of the regime in 1990, as well as on the consequences that – we expect – that this development had both on further urbanization patterns and on contemporary migratory patterns.

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A review on citizen motivation analyses for participating on urban planning process.

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DOI: 10.37199/c41000706

Abstract

The rapid development of urban areas and the rising complexity of urban concerns have caused considerable problems for urban planners. Standard methods of evaluation, including statistics, geographical information systems (GIS), and studies of literature, are no longer enough for understanding the enormous number of data and reports available. Such tremendous amount of data is calling for new, data-intensive methods to conduct research in science, urban planning, engineering etc. But it remains up to urban planners and decision-making institutions to take advantage of this potential and use urban and society informatics to gather useful information. Through an in-depth examination of current research, this review highlights crucial elements that mediate the interaction between residents and the urban planning process. Numerous studies have examined at survey design and administration, but we must also consider how to convey the request for information from residents in an appealing way for them. In comparison to survey polls, social media can provide a more scientifically accurate representation of popular attitudes of certain topics. But, despite this advantage, there seem to be limited investigations into the challenges in social media-based public opinion analysis. Furthermore, the introduction of AI and deep learning models, paired with greater processing capacity, tools, and algorithms, creates new options for addressing difficult urban issues. How could AI facilitate planners in the planning process? What methodology could be followed in order to reach a high response rate from citizens? Do the institutions possess these data? Which factors indicate the motivation and intentions of people on involving in this entire process? This study serves as a starting point for future researchers, with the goal of answering these concerns by providing a complete review of existing and potential AI applications in urban and regional planning processes. Most of the findings reveal that the level of community participation in the urban planning process in developing countries is low. As a result, this study recommends the development of a single national strategy for social media platforms used by municipal institutions, which will encourage the use of government tools such as discussion and incentives, therefore improving social networks and the effectiveness of organizers.

Keywords: AI, citizens, urban planning

Introduction

It is often discussed about the need to include the opinion of the people of a community in making different decisions, specifically those related to urban planning of the city. In developed countries there are various studies dedicated to the involvement of community people in decisions on urban changes taking place in its space. With the last few years, we can also use various works like studies done by Yang, X., & Li, H, Mitlin, D etc. But besides studies, concrete practices of this process have been created that precede processes of changing urban space.

The first goal of this paper is to make awareness of this issue in Albania. After the 90s there is a huge transformation of the country in terms of construction. Existing areas have been transformed, new areas have been created and the sensitivity to touch and change of community space is becoming increasingly greater.

On the other hand, the increment of the population, increased its diversity making it difficult for collective communication that would make it possible to discuss and get people's opinion on various problems. But today technology is helping us, which is becoming even closer to all the people. This would help not only people in fulfilling different requirements but also institutions in making fair decisions in order to meet the demands of the people.

Of course, the reality is more complex than the way we are addressing this problem, and it also includes other social and political, economic factors. But our goal is to start a work and finalize it in the future for the implementation of a practical communication with people about urban problems.

The second goal of the paper is to identify different experiences and the use of technology to reach communication with people to discuss various problems related to urban change in a community or city.

And finally, some technology-related ways will be proposed for the future to bring about such a communication practice and extract results that will help in decision making related to urban planning, The first step of this work is the design of the application interface, which will serve for a survey for professional and no-professionals.

Literature Review

In this paper we have focused on the literature of the last 5 years. We notice that there is a diversity of studies devoted precisely to the inclusion of people's opinion in solving urban planning problems. Some of these studies present an investigation scheme of the factors that influence community involvement in the urban planning process. Such studies are:

Publication by author: Ledio Alljka, November 2019 "Planning of livable cities" related to Urban Mobility where "Transparent decision-making through public involvement" is described as a new approach against "non-transparent decision-making" that corresponds to traditional planning of transportation as a necessity in today's time. Although in this study the focus is in transportation problems and not urban planning, we mention this case as offering a new paradigm in people-centered planning (Okraszewska, et al., 2018; Van Acker, et al., 2016).

Aldegheishem(Aldegheishem, 2023) in "Community participation in urban planning process in Saudi Arabia" studied the elements that influence community involvement in the process of city planning in Riyadh, Saudi Arabia. In this study, a sequence of hypothesis came about, and a quantitative approach was used to test them. This research focuses on Riyadh, one of Saudi Arabia's largest cities in terms of population, services, and economic activity. The study's target group consisted of people who are technically and scientifically active in urban planning, such as professionals, authorities, professors, and specialists. A total of 600 online surveys were given to responders via email. A total of 253 questionnaires were returned in complete, for a response rate of 42%. The findings indicate that community engagement in the urban planning process is constrained. This study presents a theoretical framework for investigating the elements influencing community engagement in the urban planning process. His research focuses on four elements that might impact community participation: knowledge, willingness to engage, social media, and political culture. As a result, this study suggests that community engagement in the urban planning process in Saudi Arabia be enhanced by adopting an integrated national strategy for social media used by urban organizations, to prevent present oversights and ease linkages across urban institutions.

According to Yang and Li, some conclusions are reached such as: community engagement is in-

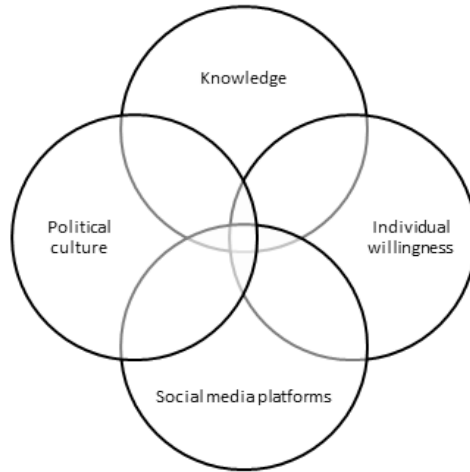


Fig.1/ Factors impacting community participation (Aldegheshem, 2023)

fluenced by factors such as the transformation of an urban space where it is a part, approach and conversation with the community, and this interactivity is not formal but reveals citizen satisfaction (Yang & Li, 2023).

Diana Mitlin in editorial “Citizen participation in planning: from the neighborhood to the city” comes up with the following conclusions: 1) The institutionalization of participation is a considerable challenge 2) Civil society uses existing spaces and makes new spaces to advance its needs and interests, and its capability to do this appears significant in explaining positive outcomes. 3) The focus on the city is significant in terms of developing understanding and strategies towards scaling participation, 4) An ongoing terrain of contestation enables more collaborative endeavors in both informal and formal spaces. 5) There are multiple iterative interactions among politics, participation, empowerment and planning (Mitlin, 2021).

Li (Li et al., 2020) developed a structural equation model to identify the causal relationships between motivational factors and intentions to participate in urban planning. In the study they found positive impacts of “Civil Society” “Personal Interest” “Social Influence” and a negative impact of “Constraints” on the intention to participate in urban planning. They developed a conceptual framework to analyze the motives and intents that drive public engagement in urban planning. Personal interest refers to an internal urge to engage in an activity that is interesting and satisfying in and of itself. Brabham (Brabham, 2012) investigated the motives for participating in a crowdsourcing initiative with the goal of increasing public involvement. The findings suggest that expressing oneself and having fun are crucial intrinsic motivators. In this research, personal interest is seen as the fundamental motive for involvement, such as to gain new skills or acquire new knowledge, to have fun, or to attain self-expression and social interaction (Li et al., 2020). On “A Theoretical Model for Enhancing Communicative-oriented and Process-sensitive Planning” on maptionnaire webpage, it lays out how to communicate with people in order to get useful information from them and how it can be possible for professionals, non-professionals and managers of institutions to cooperate. And a scheme is proposed that presents civic engagement and the knowledge gained from it, passing through several stages. Other studies are focused on the technology used to carry out this communication with the community, obtaining different opinions

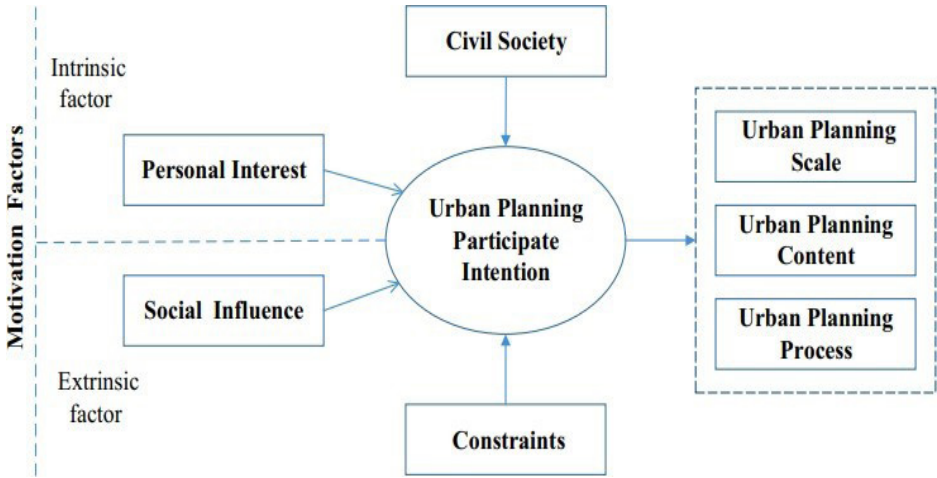


Fig.2 / Research framework (Li et al., 2020)

related to urban planning problems, and analyzing them to derive predictive models in the service of decision-making.

In the first literature listed on the “Technology facilitating community participation in urban planning” section, is mentioned about Maptionnaire, a citizen engagement platform. It enables cities, consultancies, and research organizations to easily collect local insights and make GIS-backed decisions. At its core are map-based tools for designing questionnaires, collecting information, and analyzing data (Maptionnaire, n.d.).

Let see in more detail how this platform works:

And in “Uncovering the invisible layers of locals’ values with map-based questionnaires” by Duci and Swiderski is mentioned that this citizen engagement platform and map-based tools have been gaining popularity among scholars and professionals alike, who aim at identifying these unheard voices. Map-based questionnaires (based on the Maptionnaire®platform) revolving around the is-

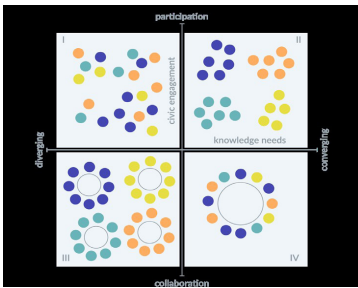


Fig.3 / The conceptual schema of knowledge creation and civic engagement (Maptionnaire)

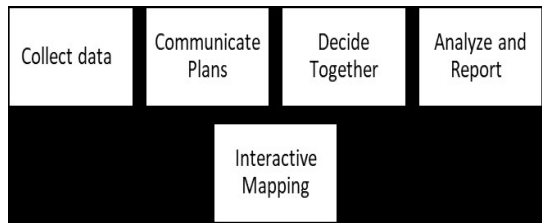


Fig.4 / Maptionnaire work stages

sues of a) personal perception of the space, and b) memories and emotions associated with the space in question (Ducci & Swiderski, 2022).

The research of Hülya Soydaş Çakır and Vecdi Emre Levent in “Data Mining the City: User Demands through Social Media” is firstly realized through social media, and data obtained from Twitter is analyzed in order to evaluate user demands for parks and green spaces of Ataşehir district in İstanbul City. Secondly, all green areas



Fig.5/ Maptionnaire platform images

in the same district are detected by using digital maps. Two applications are specifically designed for this research; Tweet Grabber is used for user sentiment analysis on social media and Map Grabber is processed for extraction of green spaces via maps. The total area of the green spaces is compared with the desired area of open and green spaces per user (Soydaş Çakır & Levent, 2021). Şeyda Emekci, in “Gathering Public Opinion about an Architectural Project: A Text Mining Approach” presented a framework for assessing the perception of an architectural project in the public eye, which is accomplished via the use of a machine learning model. In this study the social media is used, the evaluation of tweets at the sentence level has provided a valuable information about how the general public perceives the architectural project in question (Emekci, 2022).

Methods

Some technology-related proposals

It is very important this first step of defining and establishing communication with non-professionals and professionals, architects and urban planners regarding the needs and requirements of a developing community.

We think that social networks, being very usable by all people, can serve to conduct a survey of community needs and demands. In this case, a Twitter application would be very suitable, simply organized with a few key words. The idea of this interface in use would be to choose a keyword and associate it with a simple comment, without a time limit. This would enable wide-ranging involvement of people. We think that an interactivity with the architects would be more detailed. A more professional opinion is required from them. For this reason and based on our discussions with Polis University’s architects, we have taken out an image of the interface that would serve the survey with professionals, and it would be the interface of a web application.

Conclusions

In this paper, is made a review regarding studies that aim to raise awareness of the involvement of the people of a community in the changes and urban developments of their space. Another category of studies offers solutions based on today’s technology for communicating with people in the community and obtaining opinions on this aspect. Several options are also provided for the first stage of such a process, which is data collection.

Area studied	Relevant papers
Factors that influence community involvement in the urban planning process	<ul style="list-style-type: none"> • Planning of livable cities" related to Urban Mobility Ledio Alikia, 2019 • Community participation in urban planning process in Saudi Arabia: An empirical assessment Aldehneishem, 2023 • Community attachment in the context of urban settlement regeneration: Mediating role of resident interaction Yang, Huli Li • Editorial: Citizen participation in planning: from the neighbourhood to the city Diana Mitlin • Analysis of citizens' motivation and participation intention in urban planning Li, W., Feng, T., Timmermans, H. J. P., Li, Z., Zhang, M., & Li, B • Maptionnaire team June 17, 2021
Technology facilitating community participation in urban planning	<ul style="list-style-type: none"> • Maptionnaire Maptionnaire: Citizen engagement platform Mobility Innovation Marketplace (eiturbanmobility.eu) • Uncovering the invisible layers of locals' values with map-based questionnaires Marta Ducci, Maciej Jakub Swiderski • Data Mining the City: User Demands through Social Media Hülya Soydas Çakır, Vecdi Emre Levent • Gathering Public Opinion about an Architectural Project: A Text Mining Approach Şeyda Emekci 1 • The Analysis of Public Opinion in Colleges and Universities Oriented to Wireless Networks under the Application of Intelligent Data Mining WenNing Wu, ZhengHong Deng • Design and Implementation of Public Opinion Monitoring System Based on Cloud Platform Wei Wei, Long Wang, Xiaowan Li, Beibei Zhang, Rafal Scherer

Table.1 / A part of Reviewed Articles Classification

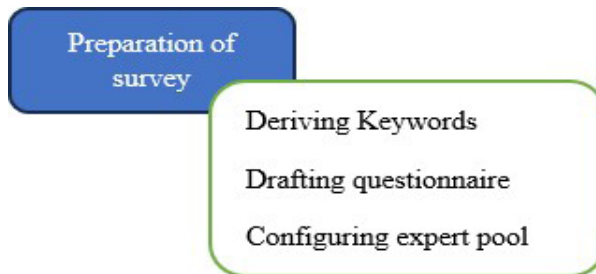


Fig.3 / First Stage

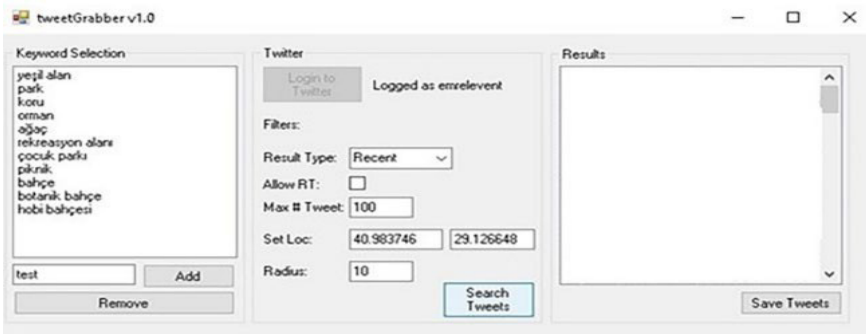


Fig.4 / Tweet Grabber Application ((Soydas Çakır & Levent, 2021)

The second stage of this process, which would be the work in the future, is the processing of these data, as well as the use of predictive models using machine learning methods.

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Assessing Walkability in Tirana: A Comparison of Three Main Boulevards

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DOI: 10.37199/c41000707

Abstract

This study aims to conduct a comprehensive analysis of walkability within a city and evaluate its potential impacts on the community. The research focuses on assessing the “walkability” level of several key streets, including “Rruga Kavajes”, “Rruga e Duresit”, and “Deshmorët e Kombit” Boulevard. The analysis is based on a set of indicators, (MCA), which have been assessed and weighted as outlined in the provided table. Field measurements were primarily conducted to estimate the performance of each indicator. The final evaluation reveals that “Deshmorët e Kombit” Boulevard scored highest across the criteria associated with a walkable street.

This assessment provides insights into the variation in walkability levels across key areas of the city and their potential impact on the local community. The study serves as a foundation for further discussions on necessary infrastructural enhancements and interventions aimed at improving walkability and aligning with sustainable development goals.

Keywords: Multi-Criteria Analysis (MCA), Tirana Metropolitan Area, Public Transport Evaluation.

Introduction

What is Walkability?

In the discipline of urban planning, “walkability” refers to the ease of access to facilities and all necessary things on foot. A road that isn’t walkable is just an urban space for vehicular transportation. Instead, they should be relatively full spaces that serve a variety of uses, users, and modes of transport and reduce the need for cars for travel. The term “walkability” was first mentioned by the urban studies revolutionary Jane Jacobs in the 1960s. In recent years, walkability has become known for its health, economic, and environmental benefits. It is a fundamental concept of sustainable urban design. Factors influencing walkability include the presence or absence and quality of pathways, sidewalks, or other pedestrian crossings, traffic conditions and roads, land use patterns, accessibility of buildings and safety, among others. Main Boulevards.

Rr. “Kavajes” is one of the main roads in Tirana. It is the most important road in western Tirana and extends westward from the central Skanderbeg Square for several kilometers, continuing further west to the Adriatic Sea. It is known for its prestigious properties and some of the most expensive residential apartments in Tirana. It intersects with Bajram Curri Boulevard.

Rr. “Duresit” is another major road in Tirana. It is one of the most important roads in western Tirana and stretches westward from the central Skanderbeg Square for several kilometers until it reaches the sea in the north of Durrës. Boulevard “Deshmoret e Kombit” is the main boulevard of the city of Tirana. Along this boulevard, there are many buildings, including the Presidential Palace, the Prime Minister’s Office, the Congress Palace, the Rogner Hotel, and the University of Tirana. The boulevard enters the city center from the south and intersects with Bajram Curri Boulevard near the Youth Park. It then

becomes part of Skanderbeg Square and continues north of the center until Zogu I Boulevard. Benefits of Walkability.

Indices of walkability have shown to be associated with Body Mass Index (BMI) and physical activity of local populations. Physical activity can prevent chronic diseases such as cardiovascular diseases, diabetes, hypertension, obesity, depression, and osteoporosis. For example, an increase in the walkability score in neighborhoods is linked to better cardio-metabolic risk profiles and reduced risk of heart attacks. The World Cancer Research Fund and the American Institute for Cancer Research published a report stating that new developments should be designed to encourage walking, arguing that walking contributes to cancer reduction. Walking has also shown to have numerous socio-economic benefits, including access, cost savings for both individuals and the public, increased land use efficiency, improved quality of life, economic benefits from enhanced public health and economic development, among others. The benefits of walkability are best ensured when the entire public corridor system is walkable - not limited to some specialized streets. More sidewalks and increased walking can promote tourism and increase property value. One of the benefits of improving walkability is the reduction of car traffic in the community. Carbon emissions can be reduced if more people choose to walk instead of driving or using public transportation, so proponents of walkable cities describe improving walkability as an important tool for cities to adapt to climate change. The benefits of fewer emissions include improving health conditions and quality of life, less smog, and less contribution to global climate change.

Objectives of Assessing Walkability in Tirana

Assessing pedestrian infrastructure: Evaluate the presence and quality of sidewalks, crosswalks, and other facilities designed for walking.

Examining street design: Analyze the layout of streets, including width, traffic flow, and presence of bike lanes or pedestrian-friendly features

Evaluating land use patterns: Assess the mix of land uses, density of development, and proximity of amenities such as shops, schools, parks, and workplaces to residential areas.

Considering accessibility: Evaluate how easily pedestrians can navigate the city, including access for individuals with disabilities and availability of public transportation connections.

Identifying areas for improvement: Pinpoint specific areas where infrastructure, design, or policies can be enhanced to make the city more walkable and pedestrian-friendly.

Promoting health and sustainability: Assess the potential health benefits, environmental impacts, and economic advantages of improving walkability in the city.

Literature Review

Tirana is the capital city of Albania and is now a highly walkable city, but its walkability is at risk, with a forecast predicting that the number of people walking could decrease by up to 50% in the next decade without proactive measures.

Walk21 proposed 4 quick actions to support the ambition to be a more walkable city, which include: establishing a multidisciplinary Walking Task Force; improving safety at road intersections; enhancing the quality of the 65 minutes that most people walk every day with a network featuring more trees, benches, and walking space; and designating school routes as part of the city's commitment to becoming the European Youth Capital.

Walk21's proposals draw from successful approaches in other cities facing similar challenges and are deemed enjoyable for citizens, scalable within the local vision and budget, and achievable within 2 years.

According to walkscore.com, Rr. Kavajes has a rating of 85/100 points, making it a very walkable

street where the majority of activities are performed on foot. Near this road, there are many different facilities, which prevent residents of this area from traveling far. Rr. Durrësit has been rated at 90/100 points, thus also being considered a paradise of walkability. All daily activities can be carried out without the need for a car or any other form of transportation besides walking. Furthermore, Boulevard “Deshmoret e Kombit” is also a paradise of walkability, with a rating of 95/100, the highest among all previous streets.

Methods

To study the walkability of the city of Tirana, we will use a combination of on-site field analysis and interaction with pedestrians, but also integrate desktop analysis method for gathering information, and use MCA (Multi-Criteria Analysis) as a methodology for assessing and scoring each boulevard.

The indicators we have chosen to measure walkability on these 3 streets are divided into 4 categories:

1. Roadside amenities
2. Road safety
3. Environment
4. Community impact

Each of these areas serves to improve walkability on the streets and to make the walking experience safe, healthy, and comfortable.

Roadside amenities

Regarding roadside amenities, we include all objects that facilitate pedestrian circulation, provide ease in their activities, and offer additional conveniences for everyone. In this category, we have decided to include bus stops, traffic lights at intersections, crosswalks, and bike lanes. There are specific rules for all these facilities on how they should be planned to make a road as walkable as possible.

Well-planned sidewalks provide continuous space for walking. They also support other activities such as street vending and waiting at bus stops without compromising pedestrian mobility. The success of a sidewalk depends on the integration of numerous elements into a coherent design.

Well-designed bus stops provide a comfortable and weather-protected waiting area for public transport passengers, leaving ample space for pedestrian movement behind the shelter. Bus stops should be placed adjacent to the bus route so that the bus does not need to deviate. Bus stops are only necessary where there is high-speed traffic and high volume.

As for pedestrian crossings and crosswalks, they should be placed wherever there is a concentrated need for people to cross the road (e.g., at a bus stop, at an entrance to a shopping center, or where a pathway crosses the road). In densely populated areas, crossings can be placed at regular intervals (e.g., every 50-100 meters). To make these crossings even safer for pedestrians, they should be signaled to vehicles using various warning signs or by raising the road level in that area to enforce speed reduction.

And last but not least, bicycle lanes are of paramount importance. For them to be efficient, they should be safe, continuous, and convenient for use. Bicycle lanes should be positioned between the sidewalk and the carriageway to minimize conflicts with other road users. They should be separated from the road and preferably with additional protective barriers that increase cyclist safety. The standard width of these lanes should be a minimum of 2 meters for one-directional movement and a minimum of 3 meters for both directions of movement.

Road safety

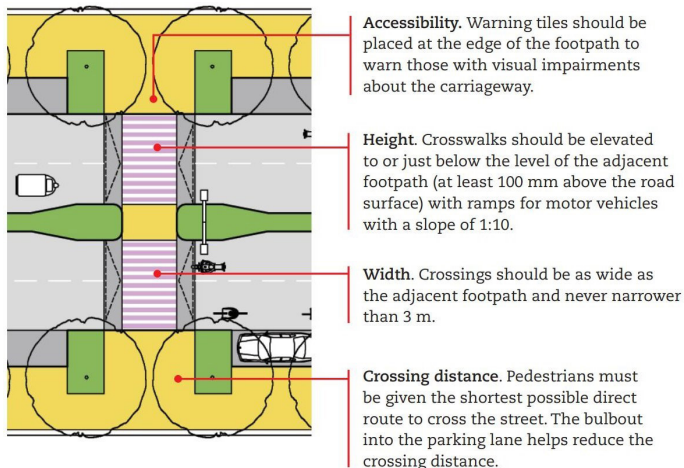


Fig.1/ Guidelines for pedestrian crossings
Source/ UN-Habitat

Road safety includes several elements such as traffic calming measures, sidewalk barriers, and their width. These elements are directly related to pedestrian safety while walking on sidewalks or engaging in other activities. Maintaining low vehicle speeds is a fundamental element of pedestrian safety. It is believed that by installing as many traffic calming and signaling barriers as possible in pedestrian areas, vehicle drivers will be more responsible in their driving.

The width of the sidewalk and roadside barriers are two other key elements that enhance safety in walking. A wider sidewalk provides more freedom in walking and also a greater distance from the vehicle lane. The width of the sidewalk varies depending on the nature of the road, whether commercial or residential, but the standard dictates that it should be at least 2 meters wide to allow the passage of two wheelchairs at the same time. The standard then varies on roads with high pedestrian intensity or on main roads. Barriers also provide additional protection in cases of loss of vehicle control and crossing onto the sidewalk. A well-designed sidewalk also includes the division or zoning of spaces with different functions within the sidewalk. In highly commercial areas with many businesses along the road, it is necessary to leave a 0.5m - 1m space at the business exit to place various objects or even as a buffer zone for their entrances and exits. Next comes the pedestrian zone, which is the most important, as it should be designed for pedestrian circulation and only pedestrian circulation without being obstructed by other objects. Lastly, there is the furnishing zone or otherwise the area where all additional street furniture objects such as trees, benches, lighting fixtures, or various trash bins are placed. A well-designed sidewalk also includes the division or zoning of spaces with different functions within the sidewalk.

In highly commercial areas with many businesses along the road, it is necessary to leave a 0.5m - 1m space at the business exit to place various objects or even as a buffer zone for their entrances and exits. Next comes the pedestrian zone, which is the most important, as it should be designed for pedestrian circulation and only pedestrian circulation without being obstructed by other objects. Lastly, there is the furnishing zone or otherwise the area where all additional street furniture objects such as trees, benches, lighting fixtures, or various trash bins are placed.

Environment

The presence of green spaces or decorative trees in pedestrian areas not only adds to the aesthetic



Fig.2/ The methodology of measuring the widths and lengths of the pavement
 Source/ Kelvi Peti using ASIG

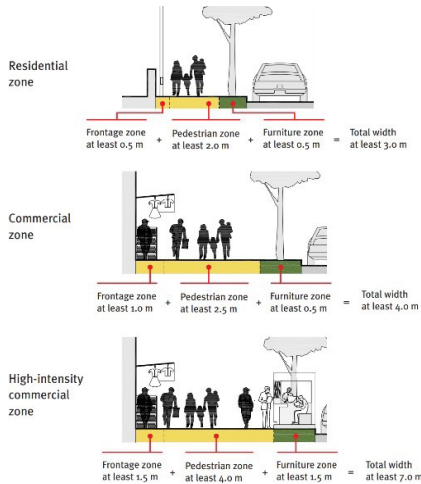


Fig.2/ Standards for the width of pedestrian space on roads with different natures
 Source/ UN-Habitat

aspect of a road but also contributes directly to the health and well-being of citizens by reducing the amount of carbon dioxide in the air. Trees in urban environments also have other essential functions, such as providing shade on hot summer days, mitigating urban heat, and creating environments and ecosystems for urban fauna.

Additionally, selecting the right type of tree for the urban environment is crucial. It should fulfill all the above-mentioned functions while not causing various problems for citizens, such as falling branches or fruits, seasonal allergies, etc.

Community impact

As we know, sidewalks are not just spaces dedicated to walking, but they are vital environments where many other forms of activities find a place and are even encouraged to create as vibrant

1.Facilitetet ndihmese te rruges	Stacionet e autobusave	Semafora ne kryqezim	Vija te bardha	Dimensionet e rruges se bicikletave		
				Gjeresia (m)	Gjatesia (m)	Siperfaqja(m2)
Rruga e Kavajes	5	22	32	3,2	920	2944
Rruga e Durrësit	2	15	23	3,2	950	3040
Bul. Dëshmoret e Kombit	3	26	20	3	1880	5640

Table.1 / Roadside amenities

2.Siguria rrugore	Tabela penguese	Koha pershkrimt (min)	Dimensionet e trotuarit			Barrierat penguese
			Gjeresia(m)	Gjatesia(m)	Siperfaqja(m2)	
Rruga e Kavajes	51	15	4	2140	8560	jo
Rruga e Durrësit	43	9	5	1900	9500	po
Bul. Dëshmoret e Kombit	35	16	7	1880	13160	jo

Table.2 / Road safety

communities as possible. Sidewalks are places where businesses conduct their activities, where people meet each other and exchange conversations, and also places where you can enjoy a coffee at your favorite bar. These, of course, must respect the rules of walking and zoning and not interfere with pedestrians' ability to pass.

Entrances and exits from private properties are often points of conflict between pedestrians and vehicles but are also unavoidable. A well-planned design of these entrances is a key factor in minimizing the effects these crossings have on pedestrian traffic. The sidewalk should not be interrupted directly but should have gradients and ramps to ensure continuity of movement for both vehicles and pedestrians.

Results and Discussion

Rr. Kavajes is also the corridor through which most of Tirana's bus lines pass, resulting in the highest number of stations. The stations are covered but somewhat small to accommodate the large flow of passengers at these stations. Additionally, in some cases, the stations hinder the movement of other citizens as they narrow the space dedicated to walking.

Crosswalks are placed at regular intervals since it is a long road with high pedestrian traffic from one side to the other. These crossings are often irregular with traffic lights but are signaled by other warning signs.

As for the bike lane, it is wide enough according to the standard and allows the passage of 2 cyclists simultaneously. Unlike other roads, this lane is located in the middle of the roadway and serves as a separation for the 2 directions of movement, but is well separated from the traffic lane with natural barriers such as trees. It is also elevated above the level of the roadway. The pavement material is soft carpet, specially designed for cyclists, allowing for easy cycling but also serving as a protective measure in the event of falls or accidents of this kind.

Rr. Durrësit has only 2 bus stations, which are below standard, lacking cabins for weather protection, covers, and are signaled only by a road sign. Since there is no structure to accommodate passengers, the stations do not cause any inconvenience or discomfort in the movement of other pedestrians.

Crosswalks are located at intersections and are mostly regulated by traffic lights, except for some serving only as a passage from one side of the road to the other.



Fig.4/ Map for the benefit of residents
Source/ Kelvi Peti

The dedicated bike lane consists of 1 lane with 2 directions of movement on one side of the road, which has the appropriate width for easy bicycle movement. The pavement material is also soft carpet, and this lane is protected by small barriers placed on the ground, not higher than 20 cm. Boulevard “Dëshmorët e Kombit” has 3 bus stations, equipped with the respective structure, covered against the weather, except for one located respectively in front of the University of Arts, which lacks the appropriate station structure. White lines are only found at the major intersections of this road and are all regulated by traffic lights.

As for bicycles, there are 2 such lanes, one on each side of the road, where each serves for one direction of movement and has a width of 1.5 meters. The latter is not elevated but is delimited by the roadway from a barrier line with traffic restrictors attached to the ground with dimensions of 20x20x80. The paving material is the same as on other roads.

Rr. Kavajes has the highest number of traffic barrier signs, as it has many pedestrian crossings that are irregularly regulated by traffic lights, so they are signaled only through signs. Also, this road has the highest number of interruptions to the roadway with white lines as it is a road with heavy pedestrian traffic. The description time is quite optimal, but it should be noted that in this observation, the conditions are ideal and do not take into account obstacles or other factors that may arise during the journey.

The width of the sidewalk remains at the minimum limits, 2 meters on each side, 4 meters in total, considering that it is a road with heavy commercial traffic and one of the main roads in Tirana. Also, in some places, the road narrows due to various construction works or other objects occupying the road. The zoning of the sidewalk is followed to some extent, but there are moments where it is not applied as it should be, and the rule is broken. The barrier between the sidewalk and the roadway also lacks anything besides a 15-20 cm curb elevation.

On Rr. Durrësit, there is a considerable number of traffic barrier signs considering that only a few of the pedestrian crossings are regulated by traffic lights, while others are signaled by various signs. The description time is quite short.

The width of the sidewalk is optimal, ranging from 2.5 meters on each side, and the zoning of the sidewalk is quite good and continuous. A feature on this road is that the sidewalk is delimited by the roadway using protective metal barriers.

Every resident who lives or wishes to move near the three roads analyzed should examine this



Fig.5/ Map for the benefits of tourists
 Source/ Kelvi Peti

map, which scores the assessment indicators of how convenient it is to walk each of them. The map includes designated bike lanes, sidewalks, but also transportation stations where road accessibility is measured. Green spaces have also been identified, as well as institutional and residential objects to distinguish which public spaces are closer to which objects. Tourists who choose to visit Tirana and do not have a private vehicle to move around must strategically choose the location of the hotel so that it is close to public transport stations to access other parts of the city. In addition to highlighting hotels and bus stations on the map, the location of public spaces is also included. As for mobility for the benefit of tourists, we have only distinguished sidewalks since the city lacks infrastructure for cycling, such means being available for rent or their resting places. The Municipality of Tirana needs this metabolic analysis to understand the areas where pedestrian friendliness is sought after and where the presence of cars is preferred. In the above map, a grid with dimensions of 30x30m has been overlaid on the 3 axes analyzed, with each 30m² carrying information about how pedestrian-friendly that area is. Our assessment has been based on 3 levels where: not very friendly areas include offices, institutions, and hotels. Somewhat friendly areas include businesses such as markets, supermarkets, and electronics stores. While friendly towards pedestrian friendliness, we have grouped service businesses such as cafes, restaurants, clothing stores, and others of this nature.

We note that primarily all three axes are friendly towards pedestrian friendliness except for areas near major intersections. The reason may be that the area near the center of Tirana has always had a dedicated function for various institutions or offices.

$$\text{Rruga e kavajes: } 9 \times 0.1 + 7 \times 0.05 + 7 \times 0.05 + 8 \times 0.1 + 6 \times 0.1 + 9 \times 0.05 + 7 \times 0.1 + 0 \times 0.05 + 10 \times 0.1 + 6 \times 0.1 + 10 \times 0.1 + 0 \times 0.1 = 6,75$$

$$\text{Rruga e Durrësit: } 5 \times 0.1 + 9 \times 0.05 + 8 \times 0.05 + 9 \times 0.1 + 7 \times 0.1 + 10 \times 0.05 + 9 \times 0.1 + 5 \times 0.05 + 8 \times 0.1 + 7 \times 0.1 + 10 \times 0.1 + 5 \times 0.1 = 7,6$$

$$\text{Bulevardi: } 7 \times 0.1 + 6 \times 0.05 + 9 \times 0.05 + 10 \times 0.1 + 9 \times 0.1 + 10 \times 0.05 + 10 \times 0.1 + 5 \times 0.05 + 6 \times 0.1 + 8 \times 0.1 + 10 \times 0.1 + 10 \times 0.1 = 8,5$$



Fig.6/ Metabolic map of friendly Walkable
Source/ Kelvi Peti

1. Facilitetet ndihmese te rruges	Stacionet e autobusave	Semafora ne kryqezim	Vija te bardha	Dimensionet e rruges se bicikletave		
				Gjeresia (m)	Gjatesia (m)	Siperfaqja(m2)
Rruga e Kavajes	5	22	32	3,2	920	2944
Rruga e Durresit	2	15	23	3,2	950	3040
Bul. Dëshmoret e Kombit	3	26	20	3	1880	5640
2. Siguria rrugore	Tabela penguese	Koha pershkrimt (min)	Dimensionet e trotuarit		Barrierat penguese	
			Gjeresia(m)	Gjatesia(m)		Siperfaqja(m2)
Rruga e Kavajes	51	15	4	2140	8560	jo
Rruga e Durresit	43	9	5	1900	9500	pr
Bul. Dëshmoret e Kombit	35	16	7	1880	13160	jo
3. Mjedisi	Hijezimi (peme cope)	Pershkueshmeria e tokes (%)				
Rruga e Kavajes	308	5% e 8560				
Rruga e Durresit	167	5% e 9500				
Bul. Dëshmoret e Kombit	45	5% e 13160				
4. Ndikimi ne komunitet	Hyrjet/ daljet publike	Hapësirat publike				
Rruga e Kavajes	0	0				
Rruga e Durresit	0	2				
Bul. Dëshmoret e Kombit	0	6				

Table.3/ Weight

Aksitet e marra ne analize	Facilitetet ndihmese te rruges				Siguria rrugore			
	Stacionet e autobusave	Semafora ne kryqezime	Vija te bardha	Hapësirat detikuat bicikletave	tabela penguese	Koha pershkrimt	Dimensionet e trotuarit	Barriera ndatese
Rruga e Kavajes	9	7	7	8	6	9	7	0
Rruga e Durresit	5	9	8	9	7	10	9	5
Bulevardi Dëshmoret e Kombit	7	6	9	10	9	10	10	5
Shpërndarja e pikeve sipas rëndësisë	0.1	0.05	0.05	0.1	0.1	0.05	0.1	0.05
	0.3				0.3			
	Mjedisi Hijezimi	Pershkueshmeria e tokes	Ndikimi ne komunitet Hyrjet/ Daljet Publike					
Rruga e Kavajes	10	6	10	0				
Rruga e Durresit	8	7	10	5				
Bulevardi Dëshmoret e Kombit	6	8	10	10				
Shpërndarja e pikeve sipas rëndësisë	0.1	0.1	0.1	0.1				
	0.2		0.2					

Table.4/ Evaluation

Conclusions

Based on the measurements we conducted to assess how walkable Tirana is on these three main axes, we noticed that there is a need or space for improvement in each of them. Given Albania's expressed desire over the years to become part of the European Union, we address below some target points for sustainable development according to the United Nations. Achieving these goals not only improves walkability in Tirana but also makes it a more sustainable and EU-friendly city. Improving air quality can be achieved by increasing pedestrian and bicycle movement and reducing heavy traffic.

In order to offer people the opportunity to walk to a destination and not use private transport, you also need to provide public spaces where they can stop and rest if they feel the need.

Meanwhile, Tirana has expressed its priority in the general local plan regarding the multimobility of the city.

In the photo, we also see the standards for the bicycle lanes placed in the PPV, which were made on all three axes.



Target

11.6

By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management

Fig.7/ Targets and indicators of sdg

Source/ United nation, Department of Economic and Social Affairs



Target

11.7

By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities

Fig.8/ Targets and indicators of sdg

Source/ United nation, Department of Economic and Social Affairs

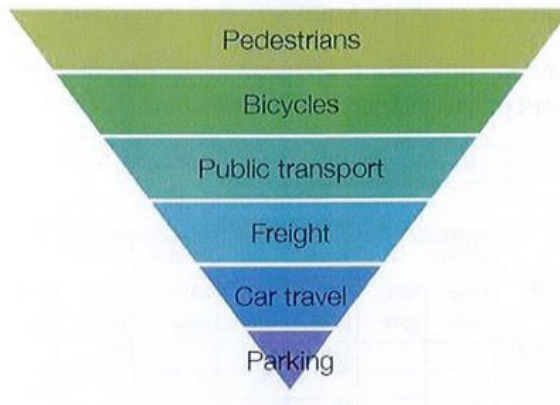


Fig.9/ Hierarchy of Mobility

Source/ Municipality of Tirana

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Acknowledgement

This research was supported and assisted by the lecturer of the Regional Planning subject, Phd. Artan Kacani. Also, our colleague Emi Kalluci has contributed to the collection and processing of data, since the subject in question was also the final submission for the subject.

Metropolitan Public Transport Lines in Tirana: Assessment of Public Mobility.

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DOI: 10.37199/c41000708

Abstract

Public transportation systems play a crucial role in providing residents with accessible transportation options in urban areas, and buses serve as the primary mode of public transportation in the Tirana Metropolitan Area due to various factors such as infrastructure limitations and urban planning challenges. This study utilises multi-criteria analysis (MCA) to evaluate 25 bus lines within the Tirana Metropolitan Area, aiming to assess their institutional impact, environmental footprint, and socioeconomic effects. The research seeks to provide insights into how these bus routes contribute to environmental sustainability, community well-being, and institutional compliance while aligning with the Sustainable Development Goals (SDGs). A comparative analysis with Vienna's public transportation system, renowned for its advanced network, highlights the challenges faced by Tirana in achieving a sustainable and efficient mobility system. Geographic mapping of public transportation stations and lines in Tirana reveals discrepancies in coverage, accessibility, and effectiveness across municipalities. Through MCA, the study systematically assesses key indicators to identify the strengths and weaknesses of each bus line. Results indicate that "The Green Line" emerges as the top-performing public transport line with a rating of 9.4, while "Qyteti Studenti" is identified as the least effective line with a rating of 3.2.

Keywords:

Public Transport System, Multi-Criteria Analysis (MCA), Tirana Metropolitan Area, Public Transport Evaluation.

Introduction

Public mobility systems represent crucial infrastructure and services that provide public transportation opportunities for citizens within urban areas. This encompasses various modes of public transportation such as buses, trains, metros, trams, public bicycles, and other services facilitating intra-city movement.

In the case of the Tirana metropolitan area, this mobility is primarily provided through buses. The reasons for this may be complex and linked to various factors including:

1. Lack of infrastructure for other services: Tirana inherits a predominantly old city infrastructure, making it challenging to intervene and offer new infrastructure such as constructed lines for trains, metros, or trams.
2. Investments and urban planning: Developing public transport lines, especially metros and trams, requires significant investments and carefully planned urban strategies.
3. Current needs and capacity: In certain instances, bus services may be more adaptable to immediate needs and the capacity of people's movement within a city.

1.1 Aim of the research

The aim of the research is to conduct a comprehensive analysis of the 25 bus lines within the

Tirana Metropolitan area. The primary focus is on using Multi-Criteria Analysis (MCA) to evaluate the performance of each bus line based on three critical dimensions: socio-economic impact, environmental impact, and institutional impact. The research aims to provide a nuanced understanding of how these bus lines contribute to community well-being, environmental sustainability, and their alignment with institutional frameworks, as well as their compatibility with Sustainable Development Goals (SDGs). By using MCA, the study aims to create a systematic and objective approach, enabling a thorough examination of the strengths and weaknesses of each bus line, contributing valuable insights for the improvement and optimization of the public transport system in the Tirana Metropolitan area.

1.2 Research Questions

- How does the socio-economic impact of the 25 bus lines contribute to access and economic activities in the Tirana metropolitan area?
- What is the environmental footprint of each bus line and how does it align with sustainable practices?
- How do institutional frameworks regulating the 25 bus lines affect their operational efficiency and overall effectiveness in providing public transport services?
- In what ways do the analysed bus lines address or contribute to social equality and inclusion?
- How does the reliability and frequency of each bus line affect the daily travel experiences of residents and visitors?
- To what extent do the 25 bus lines contribute to reducing traffic congestion and promoting a more sustainable urban transport system?
- What are the challenges and opportunities associated with integrating institutional policies to enhance the efficiency and effectiveness of public transport services?
- How do bus lines address the diverse needs of the population in terms of accessibility, affordability, and comfort?

1.3 Objectives

- Assessment of socio-economic impact
- Analysis of environmental footprint
- Examination of social equality and inclusion
- Evaluation of travel experiences
- Identification of challenges and opportunities
- Assessment of alignment with Sustainable Development Goals (SDGs)

Literature Review

Public transportation is a critical aspect of urban life, influencing the accessibility, efficiency, and sustainability of a city; therefore, many countries prioritize it. Let's take the case of the Vienna metropolitan area, known for its advanced and integrated transport network, located alongside the Tirana metropolitan area, which faces challenges in creating comprehensive public mobility.

Vienna is renowned for its highly efficient public transport infrastructure, setting high standards for metropolitan transport systems. The city's public transport network is seamlessly integrated, offering an efficient combination of buses, trams, metro lines, and passenger trains. Operated by Wiener Linien, the public transport company, Vienna's system is known for its reliability, punctuality, and extensive coverage, effectively connecting the city and its suburbs. The U-Bahn, Vienna's metro system, plays a key role in providing fast and convenient transport within the city. Supplemented by an extensive tram and bus network, Vienna's residents and visitors benefit from a

well-organized and comprehensive public mobility system. The city places a strong emphasis on sustainability, evident in its promotion of cycling through dedicated lanes and bike-sharing programs, contributing to a holistic and environmentally friendly transport ecosystem.

On the other hand, the Tirana metropolis, while in the process of developing its public mobility system, faces evident challenges. The city relies mainly on buses, minibuses, and taxis, forming the backbone of its public transport. Efforts are being made to improve the system, with initiatives such as the introduction of bike-sharing programs and the creation of pedestrian-friendly areas. However, the metropolitan area is facing issues such as traffic congestion, limited coverage of public transport, and the lack of a well-established system.

Evolution of the Mobility System in Tirana: Transformations, Challenges, and Institutional Responsibilities

Historically, the mobility system in Tirana has undergone numerous transformations and developments, including changes in infrastructure, public transportation services, and shifts in private car usage. Key historical moments that can be mentioned include:

1. Pre-1990 period: Tirana, being a relatively small city during this period, relied primarily on buses and taxis for public transportation, with private car usage being restricted.
2. Post-1990s: Following the fall of the communist regime in Albania, significant changes and developments occurred in Tirana's infrastructure and transportation system. As the economy opened up, private car ownership became permissible, introducing new challenges related to traffic and infrastructure.
3. Recent developments: In recent years, local authorities and the government have taken steps to improve the mobility system, including enhancing road infrastructure, adding bicycle lanes (primarily in the Tirana municipality), investing in public transportation, and efforts to reduce traffic congestion and environmental pollution through the addition of green lines.

In terms of institutional responsibilities, several institutions and bodies are involved in managing the infrastructure and transportation system in the Tirana metropolitan area:

1. Municipality of Tirana, Vora, & Kamza: The Municipality holds primary responsibility for managing road infrastructure and certain aspects of public transportation and urban planning in the city.
2. Ministry of Transport and Infrastructure: The Ministry oversees transport policies and strategies at the national level and may play a role in financing and supporting infrastructure projects in Tirana, Vora & Kamëz.
3. Public Transport Operators: Public transport companies are responsible for providing public transportation services and managing bus fleets.

Aligning Tirana's Metropolitan Public Transport with Sustainable Development Goals

The Sustainable Development Goals (SDGs) are a group of 17 global objectives adopted by all United Nations Member States in 2015 as part of the 2030 Agenda for Sustainable Development. These aims provide a common plan for peace and prosperity, addressing global challenges such as poverty, inequality, climate change, environmental degradation, peace, and justice.

In the analysis below, alignment with the SDGs can provide a robust framework, considering how Tirana's public transport system contributes to or challenges specific SDGs, such as:

	Lines	Socio-Economic impact						Environmental impact	
		Conformity assessment			Assessment of service coverage			Environmental assessment	
		No of seats	Safety tools	Velocity (v urb)	Frequency index	No of seats	Time spent at the station	Fuel efficiency (km/l) for 1 hour	Environmental friendliness technology
Tirana Municipality	1 A Allas - Salië	29	yes	40	every 30min	21	8	30/10	No
	1 B Allas - Kodra e Diellit 2	29	yes	40	every 30min	24	8	30/10	No
	2 Fer - Kopshtik Zoologjik - Ish Stacioni i Tiranit	42	yes	40	every 20min	6	8	30/10	No
	3A Atrë	35	yes	40	every 30min	30	8	5/1.6	Yes
	3B Kallë	35	yes	40	every 30min	21	8	5/1.6	Yes
	4 Qendër - City Park	21	yes	40	every 20min	24	8	30/10	No
	5A Lila-Uina Autotraktoriëve	35	yes	40	every 10min	15	5	30/10	No
	5B Isafiniri	35	yes	40	every 6.3 min	13	8	29/10	No
	6 Lerafshë	21	yes	40	every 20min	15	8	30/10	No
	8A Qendër - FEG	35/21	yes	40	every 10min	6	8	29/10	No
	8B Qendër - Senatortim	21	yes	40	every 60min	12	8	30/10	No
	8C Qendër - Sullku i Vjeterë	21	yes	40	every 60min	15	8	30/10	No
	9A Qyteti i Shëndetit	21	yes	40	every 60min	14	8	31/10	No
	9B Vllat Gjermano	21	yes	40	every 60min	13	8	30/10	No
	10A Materionit i Ri - Qendër	21	yes	40	every 20min	17	5	31/10	No
	10B Qendër - Mina e Germame	21	yes	40	every 10min	12	8	30/10	No
10C Rrethorollimi Shkollë-Ish fusha e Aviatonit	21	yes	40	every 60min	15	5	30/10	No	
11 Përdendi	29	yes	40	every 10min	13	15	30/10	No	
12 Uina Dnamo	35	yes	40	every 7min	17	8	30/10	No	
13 Tirana e Re	35	yes	40	every 7min	27	8	30/10	No	
15A Kombinat-Kinoaudito	35	yes	40	every 10min	18	8	30/10	No	
15B Kombinat-Trifina	35	yes	40	every 8.5min	9	8	23/10	No	
16 Linja e Gjëshër	35	yes	40	every 6min	18	5	5/1.6	Yes	
Vorë Municipality	7 Vorë	33/35/21	yes	40+	every 20min	19	8	32/10	No
Kamzë Municipality	14 Kamzë	35	yes	40+	every 10min	25	8	31/10	No

Table.1/ Identification and integration of weak points and strong points of 25 urban transport lines.

Objective 11 (Sustainable Cities and Communities):

– Assessing how Tirana’s metropolitan public transport contributes to making the city more sustainable, accessible, and resilient.

Objective 3 (Good Health and Well-being):

– Evaluating the impact of public transport on the health and well-being of Tirana’s metropolitan residents, taking into account factors such as air quality, traffic safety, and access to healthcare facilities.

Objective 13 (Climate Action):

– Assessing the sustainability of Tirana’s metropolitan public transport in reducing greenhouse gas emissions and promoting environmentally friendly transport options.

Objective 10 (Reduced Inequalities):

– Analysing how the public transport system addresses or exacerbates social and economic inequalities within the Metropolis.

Objective 5 (Gender Equality):

– Examination within the field of public transport can contribute valuable insights into addressing gender inequalities in urban mobility and creating a safe environment.

Linking research to the SDGs can provide a global context for the importance of Tirana’s metropolitan public transport in sustainable development and demonstrate the interconnectedness of urban planning with broader international goals.

Methods

This study aims to fully assess public transportation effectiveness within three municipalities, by applying Multi-Criteria-Analysis framework. Integrating research, and multi-criteria analysis the methodology includes three main phases: data collection, analysis and interpretation. Data collection process included gathering of all necessary information. This involved literature review as well as field data collection and direct communication with employees in this sector. In the analysis phase, geospatial techniques were used to interpret and visualize the collected data effectively. To generate the maps, data from the respective municipality’s official websites and open data were used. Also, in these maps (figure 3,4,5) station points were used, and a determining radius value of 400 meters was employed for each station. The core analytical framework employed in this study is the Multi-Criteria-Analysis. These methods help to consider different factors in the process. The structure developed includes weighting, scoring, and aggregation to evaluate performance in different bus lines of public transport.

Results and Discussion

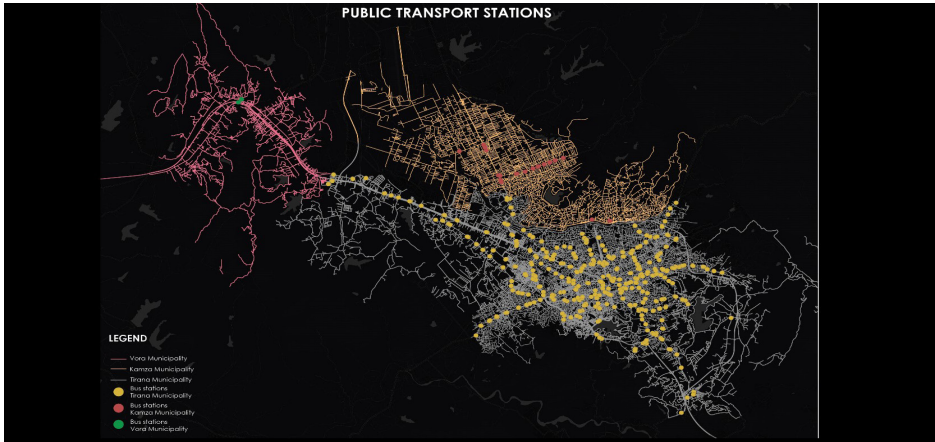


Fig.1/ Public transport stations in the municipalities: Tirana, Vora & Kamza

Based on these analyses, the most notable observation is the Municipality of Tirana, which has the highest number of stations and routes, whereas the Municipality of Vorë only has 2 stations and just 1 route enabling transport. The analyses above concern the coverage radius of public transport for all three municipalities in the metropolitan area. Regarding the evaluation of the bus lines, the worst line was Qyteti i studentit, while the best was the Greenline, both of these lines operate in the municipality of Tirana.

What stands out in the three aforementioned maps (Figures 3, 4, 5) is the public transport coverage in the Municipality of Vorë, which is entirely inadequate, clearly illustrating how a significant portion of the territory lacks proper access to that service. Similarly, in the Municipality of Kamëz, it can be observed that a considerable part of the territory lacks access to public transport.

In the case of the Municipality of Tirana, public transport coverage is good, with very few areas unable to access public transport. However, in the case of Tirana, the problem lies in the system of connecting transport routes. In Figure 2, it can be clearly seen how all routes tend to converge towards the center, the only hub enabling connections between peripheral areas (Figure 6). The trends in the territorial development of Tirana are becoming radial, but in the case of public transport, this development is not yet being reflected.

In the tables below, the evaluation and weighting of indicators for public transportation lines are presented. Regarding their evaluation, the value representing the minimum assessment is 1, and the value representing the maximum assessment is 10. These indicators were assigned a specific weight based on their importance in this assessment, and then all points were aggregated to present a final evaluation score.

The tables provided present the evaluation and weighting process of indicators based on the framework of the Multi-Criteria-Analysis. At first, indicators needed for the evaluation were determined. Table 1, showcases the evaluation of these indicators, representing the assessment of each one's performance on a scale from one to ten, where a score of 1, indicates a weak performance and a score of 10 the highest performance.

Table 2 outlines the assignment of specific weights to each indicator based on its perceived importance. After the necessary calculations, the evaluation of each public transportation line was derived. This provides a measurable basis for evaluating performance and prioritizing criteria according to their significance.

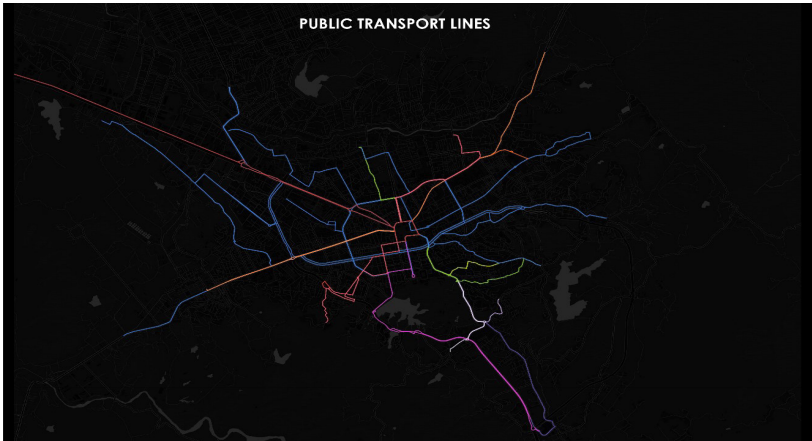


Fig.2/ Public transport lines in the municipalities: Tirana, Vora & Kamza

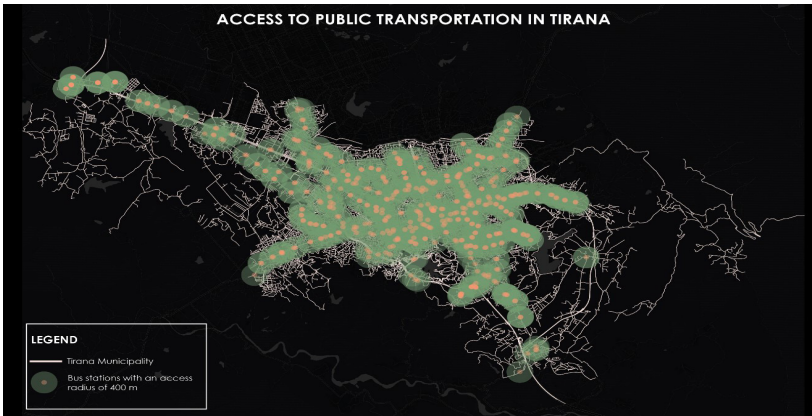


Fig.3/ The coverage radius of the public transport services in the municipality of Tirana

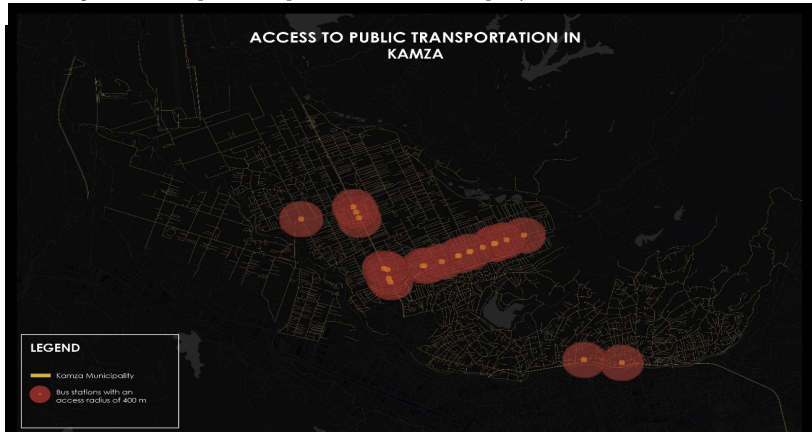


Fig.4/ The coverage radius of the public transport services in the municipality of Kamza

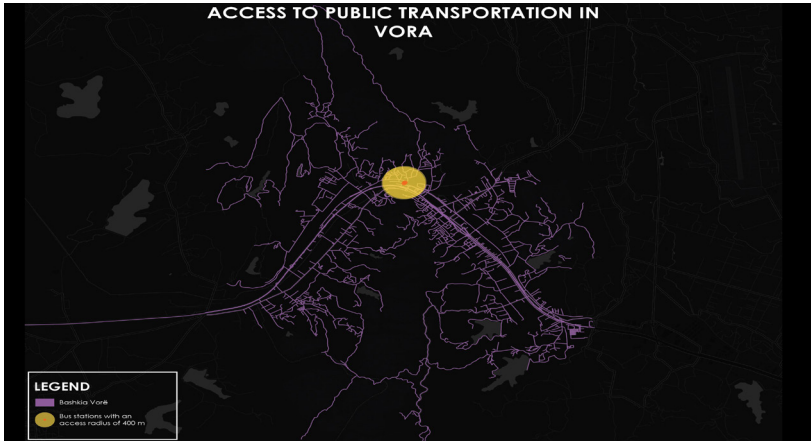


Fig.5/ The coverage radius of the public transport services in the municipality of Vora



Fig.6/ The main poles where the lines meet

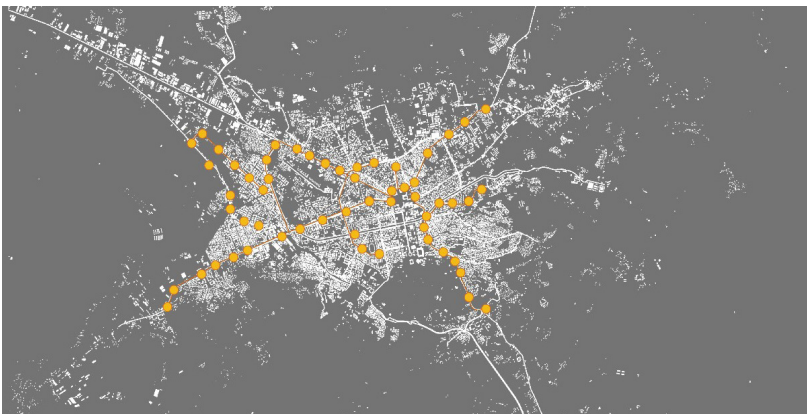


Fig.7/ Multistations, stations accessible from 2 or more lines

	Linjat	Socio-Economic impact					Environmental impact		
		Conformity assessment			Assessment of service coverage			Environmental assessment	
		No of seats	Safety tools	Velocity (+ v urb)	Frequency index	No of seats	Time spent at the station	Fuel efficiency (km/l) for 1 hour	Eco-friendly technology
Tirana Municipality	1 A Allias - Sëditë	6.9	10	10	5	7	7	2	1
	1 B Allias - Kodra e Diellit 2	6.9	10	10	5	8	7	2	1
	2 Teg - Kopëshiti Zoologjik- Ish Stacioni i Trenit	10	10	10	6	1	7	2	10
	3A Astir	8.3	10	10	5	10	7	10	10
	3B Kashar	8.3	10	10	5	7	7	10	1
	4 Qendër-City Park	1	10	10	6	8	7	2	1
	5A Ish-Uzina Autotraktorëve	8.3	10	10	8	5	10	2	1
	5B Instituti	8.3	10	10	10	4.3	7	2.5	1
	6 Laprakë	1	1	10	5	5	7	2	1
	8A Qendër-TEG	6.9/8.3	1	10	8	1	7	2.5	1
	8B Qendër-Senatorium	1	1	10	1	4	7	2	1
	8C Qendër-Sauk i Vjetër	1	1	10	1	5	7	2	1
	9A Qyteti i Studentit	1	1	10	1	4.6	7	1.7	1
	9B Vilar Gjermane	1	1	10	1	4.3	7	2	1
	10A Materiteti i Ri-Qendër	1	1	10	5	5.6	10	1.7	1
	10B Qendër-Mihal Grameno	1	1	10	8	4	7	2	1
10C Rrethrotullimi Shkozë-Ish fusha e Aviacionit	1	10	10	1	5	10	2	1	
11 Porcdani	6.9	10	10	8	4.3	1	2	1	
12 Uzina Dinamo	8.3	10	10	9.5	5.6	7	2	1	
13 Tirana e Re	8.3	10	10	9.5	9	7	2	1	
15A Kombinat-Kinostudio	8.3	10	10	8	6	7	2	1	
15B Kombinat-Tufinë	8.3	10	10	9	3	7	1	1	
16 Linja e Gjelbër	8.3	10	10	10	6	10	10	10	
Vora Municipality	7 Vora	6.9/7.8/8.3	10	1	6	6.3	7	1.5	1
Kamza Municipality	14 Kamëz	8.3	10	1	8	8.3	7	1.7	1

Table. 2/ Evaluation of indicators.

	Lines	Socio-Economic impact					Environmental impact			
		Conformity assessment			Assessment of service coverage			Environmental assessment		
		No of seats	Safety tools	Velocity (+ v urb)	Frequency index	No of seats	Time spent at the station	Fuel efficiency (km/l) for 1 hour	Eco-friendly technology	
Tirana Municipality	1 A Allias - Sëditë	6.9	10	10	5	7	7	2	1	6.5
	1 B Allias - Kodra e Diellit 2	6.9	10	10	5	8	7	2	1	6.6
	2 Teg - Kopëshiti Zoologjik- Ish Stacioni i Trenit	10	10	10	6	1	7	2	1	6.2
	3A Astir	8.3	10	10	5	10	7	10	10	8.8
	3B Kashar	8.3	10	10	5	7	7	10	10	8.5
	4 Qendër-City Park	1	10	10	6	8	7	2	1	6.3
	5A Ish-Uzina Autotraktorëve	8.3	10	10	8	5	10	2	1	7.1
	5B Instituti	8.3	10	10	10	4.3	7	2.5	1	7.1
	6 Laprakë	1	1	10	5	5	7	2	1	4.1
	8A Qendër-TEG	7.6	1	10	8	1	7	2.5	1	4.6
	8B Qendër-Senatorium	1	1	10	1	4	7	2	1	3.4
	8C Qendër-Sauk i Vjetër	1	1	10	1	5	7	2	1	4.1
	9A Qyteti i Studentit	1	1	10	1	4.6	7	1.7	1	3.2
	9B Vilar Gjermane	1	1	10	1	4.3	7	2	1	3.4
	10A Materiteti i Ri-Qendër	1	1	10	5	5.6	10	1.7	1	4.4
	10B Qendër-Mihal Grameno	1	1	10	8	4	7	2	1	4.5
10C Rrethrotullimi Shkozë-Ish fusha e Aviacionit	1	10	10	1	5	10	2	1	5.6	
11 Porcelani	6.9	10	10	8	4.3	1	2	1	6.1	
12 Uzina Dinamo	8.3	10	10	9.5	5.6	7	2	1	7.1	
13 Tirana e Re	8.3	10	10	9.5	9	7	2	1	7.4	
15A Kombinat-Kinostudio	8.3	10	10	8	6	7	2	1	7.5	
15B Kombinat-Tufinë	8.3	10	10	9	3	7	1	1	6.6	
16 Linja e Gjelbër	8.3	10	10	10	6	10	10	10	9.4	
Vora Municipality	7 Vora	7.6	10	1	6	6.3	7	1.5	1	5.2
Kamza Municipality	14 Kamëz	8.3	10	1	8	8.3	7	1.7	1	5.7
Distribution of points according to importance		7%	20%	15%	15%	10%	10%	15%	8%	
		0.07	0.2	0.15	0.15	0.1	0.1	0.15	0.08	

Table. 3/ Weighting of indicators.

Conclusions

From the analysis conducted through mapping, the following conclusions emerged:

1. In the Tirana metropolitan area, the Municipality of Tirana has the highest number of stations, better accessibility, and more transport lines.
2. The Municipality of Vora has very low accessibility, with only 2 stations, leaving a large part of the territory without coverage from this service.
3. Despite the circular territorial development of Tirana, the public transport system continues to be monocentric, where the peripheries are connected only through central routes.

The analysis of the indicators included in the multi-Criteria Analysis allows us to make a comprehensive assessment of the aspects of the public transport system in the three mentioned municipalities. In the evaluation analysis phase, the indicators were rated from 1 to 10, with 1 corresponding to the lowest rating and 10 to the highest rating. From this phase, the following conclusions were drawn:

1. The Teg-Zoo-Former train station line has a high number of seats; however, given its low frequency, there is a risk of overcrowding, which does not justify the high rating of this indicator.
2. Most transport lines are equipped with safety measures, indicating a safe and reliable experience for citizens. However, a considerable number of lines were not equipped with these measures, raising doubts about their efficiency.
3. Regarding the speed of these buses, urban lines do not exceed an average speed of 30 km per hour. Lines such as Vora or Kamza, which are interurban lines, may exceed this speed, affecting the comfort and safety of passengers, hence these two lines have the lowest rating.
4. Five out of twenty-five analyzed lines have a frequency indicator of once every sixty minutes. This indicates that these lines have inadequate and low accessibility.
5. Lines like Center-TEG and TEG-Former train station have the lowest number of stops. This indicates that these lines have limited-service coverage and low accessibility.
6. The Porcelan line spends a very long time at the station. This leads to an unstable flow of this line, overcrowding of the bus, and low passenger comfort.
7. Three out of twenty-five bus lines have a "Hybrid" system, meaning they operate with battery power at speeds up to 25 km per hour, and after that, they switch to combined petrol and battery power, making these lines efficient. This efficiency reduces operational costs and mitigates environmental impact. The rest of the lines have a very low rating for this indicator, indicating a high level of pollution.
8. The introduction of three "Hybrid" lines indicates an effort to reduce emissions and align with sustainable transport practices.

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Light and innovative fiber technologies, as inspiration for future Fashion

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DOI: 10.37199/c41000709

Abstract

Technological development has brought many changes to our lives, not only in the different way we live our daily lives but also in our way of dreaming and seeing the future.

The textile companies that produce intelligent fabrics and nanotechnology with its interactivity make us live and feel different. The radical changes of this millennium have also influenced the way in which fashion designers create their clothes or their creations. The same also applies to architects, who see textile materials as a way to recreate living spaces or even create temporary spaces with a flexible material, which can create a temporary home which also reduces costs.

If well before the technological era, clothes were created to have a communication code, or a way to stand out in society, now this is not enough, clothes are created above all to have their own echo personality, which also makes us stand out. The discovery of chemical fibers has profoundly modified the traditional conception of designing fabrics. The fundamental properties of cotton and wool are immutable, static. It is the technology of the spinner, the weaver, the textile ennobler that must adapt to this changeability by trying to create something new. Chemical fibers and their polymers, on the other hand, can be produced with properties tailored to each specific need. It can be said that until yesterday fabrics were manufactured and processed; today they are designed with precise purposes at a structural level. Matter becomes 'intellectualized', the terms 'material' and 'invention' overlap. For this reason, all the companies that produce and experiment with new textile materials have and will have a great influence on the creations that will come because the fabric already comes out of the company with its own functionality, it is that functionality, it is that functionality, it is that it is functionality, it is that functionality.

The beginning of the 20th century.

Between the end of the nineteenth century and the beginning of the twentieth century, a patrol of scientists opened the way to a new knowledge of the world: And the era of Maxwell, Hertz, Planck, Einstein, Thomson. The distance between science and its technological applications tends to disappear. A new figure of scientist is emerging who has a completely new attitude to the mathematical abstractness of the conception of the world, draws the consequences of scientific achievements, translates them into applications, brings science into everyday life. It is in this period and thanks to this new attitude that man-made fibers were born and developed.

Tracing the prehistory of natural textile fibres, the first finds that testify to their use by man date back to around 5,000 BC. It therefore took 7,000 years of civilization to arrive at the "patent for artificial silk", in 1884.

It is in this period and thanks to this new attitude that man-made fibers were born and developed. Tracing the prehistory of natural textile fibres, the first finds that testify to their use by man date back to around 5,000 BC. It therefore took 7,000 years of civilization to arrive at the "patent for artificial silk", in 1884. About 50 years passed and the first synthetic fibre, nylon, was discovered, developed by Carothers in 1935. Less than twenty years later polyester, acrylic, polypropylene were



Fig.1/ 1/a James Clerk Maxwell, 1/b Heinrich Rudolf Hertz, 1/c Karl Ernst Ludwig Marx Planck, 1/d Albert Einstein Ulm, 1/e Joseph John Thomson

added to the synthetic family... starting a chain of explorations, which led man-made fibers to represent, in the new millennium, over 60% of global textile consumption and more than 75% of European ones. In 2001, for the first time, the most used fiber in the world will be polyester, no longer cotton. This acceleration in consumption has its now well-known motivation in the “designability” of man-made fibres, that is, in their ability to evolve and innovate, foreseeing and interpreting not only the needs of processors and consumers, but also the “spirit of the times”. And this is already a good demonstration of “intelligence”.

In the 1950s, fibers were advertised to the general public with means worthy of consumer products. The need for a brand is created.

The philosophy with which the fibers approached the market at the beginning was that of modernity, of ‘easy care’, with a great push to replace and imitate natural fibers in all possible uses.

In the 1960s and early 1970s, fibers entered the world of fashion and discovered the most imaginative applications in yarns and fabrics, thanks to aesthetic and design research carried out by the style centers of large producers, which for many years they acted as a guide to the textile industry, already established in the world for creativity and good taste. The concept of imitation and substitution soon proved to be harmful because it inevitably led to the offer of products that were not suited to the needs of the consumer, and often lost in comparison with natural fibres, as they did not respond to the intrinsic application potential of the individual man-made fibres. in relation to the end uses (terrifying nylon shirts or irrational waterproofs in

acrylic made their appearance in those years). The concept of partnership was outlined and developed, more or less in the same period, also under the pressure of the counter-offensive of natural fibres, whereby man-made fibers were combined with wool, cotton, linen or silk to improve their performance, increase their durability and facilitate maintenance. Attention to comfort was also accentuated and, at the same time, safety was also rediscovered as a value to which fibers could contribute, with the development of ‘flame retardant’ types. These are the years that also mark the strong emergence of acrylic in fashion and sports knitwear and polyester in tennis shorts.

The 70s followed with great changes in the discovery of new fibres, and part of this change in development was due to the first oil crisis. If Europe was previously the exporter of fibres, now

¹James Clerk Maxwell (1831 - 1879) The famous Scottish physicist, who discovered the theory of electromagnetism and forever changed our views on the nature of light

²Heinrich Rudolf Hertz (Hamburg, 22 February 1857 – Bonn, 1 January 1894) was a German physicist. He was the first to demonstrate the existence of electromagnetic waves with an apparatus of his own construction, the Hertzian dipole, capable of emitting radio waves . In honor of him, in the international system the frequency is measured in hertz.

it becomes the importer, and the countries that had oil are transformed into new countries that develop and produce the new fibres. Thus the substitution of synthetic fibers for natural ones has slowed down. At the same time the lifestyle and fashion of the moment also changes, everyone becomes against everything that is plastic, and the natural is favored. Jeans are back in fashion, and everything that is handmade. In this climate of changes, other developments develop and are created, no longer in the way of creating new fibers but in the way of developing the fibers that had been created up until then. The fundamental properties of cotton and wool are immutable, static. It is the technology of the spinner, of the weaver of textile ennoblement that must adapt to this immutability, trying to create something new. Chemical fibres, on the other hand, are dynamic and can be designed according to different needs. This means that the basic characteristics can be modified according to the results you want to achieve, with long-lasting effects, not susceptible to changes due to use and washing precisely because the modification is made in the structure of the fiber itself. Nylon, for example, changes its characteristics when it must be used to make tires or underwear or bulletproof vests while still remaining nylon. Their programmability is the fundamental success of chemical fibers, because we always try to develop them according to our needs. In the 80s the most used word was “micro”, the continuous process of refinement of the titles led to the birth of microfibrils, whose use and image dominated the market for a long time, further accentuating comfort and giving birth to classes of totally new. The basic concept that was thus established was that of overcoming; certainly not imitation, but not just partnership anymore, which however remains an acquired value. Research had finally developed fibers with characteristics that went “beyond natural”, allowing the creation of finished products with hitherto impossible performances, which offered decisive solutions for a

better quality of life. And we shouldn't just think about clothing which, particularly with sportswear becoming increasingly functional and hi-performance, has affected consumer lifestyles; or to furnishings, finally safe, long-lasting and even more beautiful and comfortable.

It is necessary to consider the enormous development of the sector of so-called technical uses: from non-woven structures for geotextiles to those for medical use, from textiles for means of transport to construction, from protective clothing to filtration systems. In recent years, society has fallen in love with the cult of the body and the high-tech look. Gore-tex is born, waterproof and breathable fabrics and heat-sealable polyester pods are born, fabrics that minimize the air resistance coefficient (c_x) and help to break speed records, microfibre fabrics that have allowed Reinhold Messner to survive in Antarctica, polyester ‘fleece’ fabrics replacing sweatshirts. From the first developments for sportswear, comfort has always been developed and sought in a fabric and fabrics have been created that have the ability to act and transform according to man's bodily needs. The ability of a fabric to maintain a constant body temperature despite changes in external temperature is not the consequence of the composition of its fibres, natural or synthetic, but exclusively of how the fabric was constructed. The most effective thermal insulation is in fact the air that warms up due to its proximity to the body. For this to happen, the structure of the fabric must be such as to ‘store’ a sufficient quantity of air and, above all, capable of blocking it in very small ‘cells’ between which it cannot move too freely. Even in this case of technological development it is still nature that helps to create, for example if we study the behavior of birds, when it is very cold they inflate their feathers, increasing the volume of air trapped between the feathers. The greater

³Karl Ernst Ludwig Marx Planck, known as Max (Kiel, 23 April 1858 – Göttingen, 4 October 1947) He created the quantum theory, which together with Albert Einstein's theory of relativity is one of the pillars of contemporary physics.

⁴Albert Einstein Ulm, 14 March 1879 – Princeton, 18 April 1955 Demonstrates the validity of Planck's quantum theory through the photoelectric effect of metals; he provides a quantitative evaluation of Brownian motion and the randomness hypothesis of the same; he expounds the theory of special relativity, which precedes that of general relativity by about a decade.

⁵Joseph John Thomson (Cheetham, 18 December 1856 – Cambridge, 30 August 1940) was a British physicist. He is known for discovering the negatively charged particle: the electron.

quantity of air that penetrates between the feathers, even if it is cold, quickly warms up thanks to the heat that emanates from the bird's body and works as a thermal insulator.

The existence of a microclimate between skin and fabric is essential for comfort. The lack of microclimate between fabric and skin causes the humidity emitted by the body to condense on site and this creates an adhesion force between fabric and epidermis which makes the garment extremely unpleasant, whatever the fiber that makes it up. The fabrics must be made in such a way as to retain the ability to create this microclimate in contact with the body even after repeated washing with water or dry cleaning. The different movements that we make during the day cause our body to produce different quantities of humidity. For this reason, when you make a big physical effort and sweat a lot, it is preferable to use fabrics made with fibers that have a lower absorption capacity but better transport characteristics, i.e. that do not soak up sweat but transfer it more quickly from the skin to the environment as do polyester, polyamide, acrylic and polypropylene. The fact that synthetic fibers are better than natural ones is only due to the fact that synthetic ones can be produced in desirable length and natural ones have the limitation of the length of the fiber, and for this reason that when weaving with natural fibers they can have more difficulty in having a compact and clean fabric during weaving, however with synthetic fibers these difficulties do not exist due to the unification that the fiber presents.

The word that represents the 90s was "eco", an ecological awareness spread even in textiles, which gave rise to the bringing of production plants up to standard from the point of view of environmental impact, and to product or process certifications (Oeko-Tex, Ecolabel). The recycling of materials was also developed, so that, for example, polyester fiber was given a new life from PET bottles and excellent caprolactam began to be obtained from disused polyamide carpets. The search for lightness in clothing will lead to an unimaginable expansion of microfibres destined to become the standard product of the future. With microfibre technology it will be possible to have hollow fibers with a diameter of a few microns. With these new products, padded fabrics with minimum thickness and feather weight will be created, warm like a duvet but not bulky. The creation of fibers was already being hypothesized, including the incorporation of ceramic compounds which, upon contact with light, can produce a beneficial sensation of heat to obtain fabrics that store the heat of the sun's rays and are able to conserve it. Interventions on the chemical composition of the polymer have increased fivefold, leading to new specialties, some already on the market, others in an experimental phase: from the fiber that changes color according to light and temperature, to the fiber that perfumes the fabric according to the desired essence, to the defined fibers 'functional' that respond to specific needs for well-defined fields of application. This rapidly expanding family includes fibers that conduct electricity, indispensable in fabrics for sterile room and clean room clothing, bactericidal fibers which will increasingly find application in the health and hygiene field, and flame retardant fibres, whose use is limited today to a few sectors but which with the growth of a social conscience oriented towards prevention and safety, will become a much more widespread reality, for example in textiles and home furnishings and children's clothing. To give an example, bacterial fibers capable of killing all bacteria, even those that cause bad odor, or electrostatic fibers which will replace current treatments, which are expensive and ineffective, and will guarantee a real reduction in annoying discharges, are bi-component. electrical. Until now, 'hi-performance' fibers - such as carbon fibers or aramid fibers such as Kevlar - have always been linked to images of great performance or very high technology.

The word that re-presented the beginning of the new millennium was "anti", the fibers have become anti-bacterial, anti-static, anti-magnetic, anti-stress, anti-UV, anti-dirt, anti-bullet, always more flame-retardant, and the list seems to grow with recent discoveries, or with fibers already known, but relaunched in a marketing key suited to new times. The fiber industry is thus inspired by the concept of "wellness", a well-being that is no longer just physical but also spiritual, a serenity

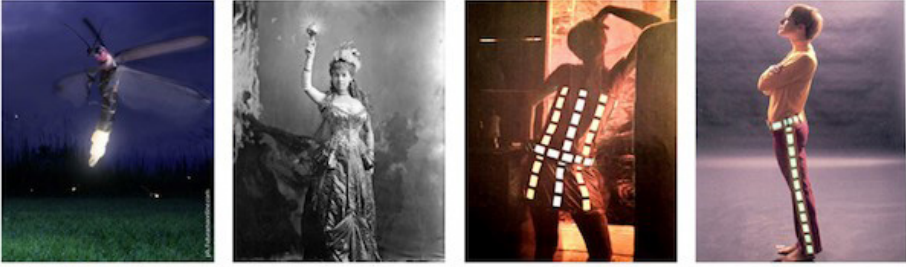


Fig.2 / Photo by fergregory/iStock/Getty Images Plus

and harmony of body and mind in which clothing, living spaces and means of transport, thanks the functionality and performance of the fibers that compose or decorate them also play a decisive role. In the new millennium, fibers will be able to capitalize on all the values they have acquired during their evolution. They have therefore confirmed that they are “intelligent” raw materials, too in the opinion of consumers, because they are present in daily life in a thousand forms already acquired and appreciated or introduced by new technologies.

Light

The concept of the body that emits light is described as a sacred body, giving divine forms to the body that appears to us as magical, starting from ancient times when the relationship with artificial light was more limited. This insight into light-reflecting or light-transmitting materials has a large number of approaches in different periods of human history. In ancient times, people used different items found in nature to illuminate their bundles. In some tribes, in different ceremonies and rituals, for example in Haiti, some vests are used which are influenced to call the holy spirits. In Central America, in the Middle East and in Asian culture, people are convinced that by transmitting light you can ward off evil spirits. Light can also be seen as a synonym of power, it is almost equated with the power of the sun as a great and unknown but necessary power for our lives.

There are also many microorganisms that transmit light to our planet, starting from squids to fireflies. This is a way of inspiration where artists and designers try to reflect and collaborate with chemists and biologists to realize their ideas and to create new possibilities for interactive textures with the human body. Biologists are using some bacteria that transmit light, they release the light enzyme that is responsible for the production of bioluminescence, to present it as a luminous thread. Trying to find opportunities to feed these bacteria that emit light throughout their life cycle. These threads can be woven or interwoven in the creation of the fabric. It can be designed as a textile layer that is placed between two fabrics that must resist steam to create the first Glow-in-the-dark fabric.

The interaction between light, electricity and fashion is not a phenomenon of the 20th century. From the end of the 1870s-1880s in France and England, some lighting accessories which, connected to a battery, create a stage light, become fashionable objects. The journal *La natura* of Scientific American documents several drawings of Monsieur Trouvein Parigi, labeled as electric

^{2a} <https://www.indianaconnection.org/harnessing-the-power-of-the-lightning-bug/>

^{2b} Mrs. Cornelius Vanderbilt aka Alice Claypoole Gwynne as 'Electric Light'. Gown created by Charles Frederick Worth. Vanderbilt Ball, March 26, 1883.

^{2c-d} <https://chantillylacevintage.wordpress.com/2014/09/15/diana-dew-and-wearable-pop-art/comment-page-1/>.

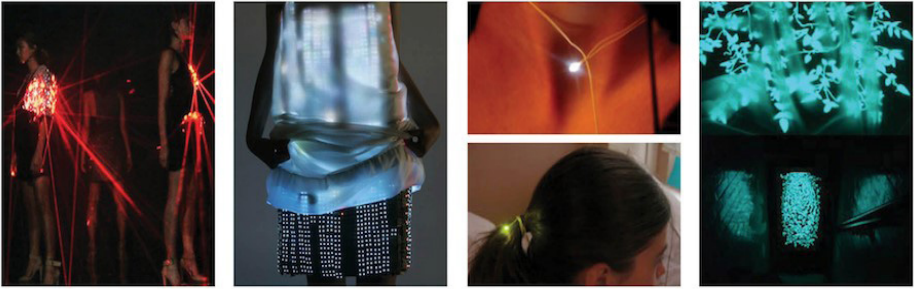


Fig.3a, b / Hussein Chalayan – Airborne – Video Dresses, 5050. Moi 2003.

jewels, which could be used by dancers and stage performers. They were charged by 2-4 volt batteries which were hidden under clothing. Some glass stones, which were placed on the lamps, shone on the power of the light as if they were precious stones.

Also, in the 60s, different designers tried to place light as part of their creativity, making the clothes more contemporary. In 1967, the designer Diana Dew created a garment with pants that transmitted light pulses from the pants, she also created a rechargeable battery for them. Time magazine of that time quoted him in an article about flexible plastic lamps sewn into clothing and pants. People who had this clothing could adjust the pulse rate from 1 to 12 pulses per minute, while the battery lasted up to 5 hours.

Also, the works of the designer Hussain Chalain have created wonderful works through the images of technology and fashion. During the 90s, he studied and applied the importance of artificial light in fashion clothing. In the 1995 collection through lighting he created his collection with religious themes by placing light inside the garment.

In 2003, more than 100 years after Trouve created his artificial light bulb, the Washington Post pointed out that the new sophisticated generation would be illuminated with MOI electric bulbs. For only 25 dollars you could have a piece of light that looks like a diamond. Created by (Seymour, 2008) attached to a thin thread that connects to a small battery. She sells the product as an accessory, which can be used as a pendant like a bracelet or a hair clip, it is the consumer who decides the way to use this simple but attractive piece of jewelry through the light it transmits through several colors.

While the light slipper is a curtain which, through gradual illumination, creates the sensation of dawn light and develops the process of gradual awakening. Humans are biologically influenced by light, so morning light conditions us and wakes up, in the case of Light slipper, artificial light stimulates the same effect on humans by programming a constant biological clock. The same weaving of threads that create the process of gradual illumination can be designed on quilts or different sleeping clothes. The development of this field requires the cooperation of lighting elements and a new way of charging for new recharging alternatives. Another development is related to chemistry, which with its development can chemically create mixtures of substances that chemically work together to transmit light under certain conditions. Japanese designer Kunihikomorinaga, one of the finalists of the LVMH prize, for many years, in addition to designing his collection, he also designs and creates the fabric itself, creating more and more innovative material in the world of textile design. A texture that he has created related to the theme of light is a fabric which during the day seemed simple and white and under the influence of ultraviolet rays it was transformed into a fabric with a colorful texture. He designs under the brand name ANREALAGE he created.

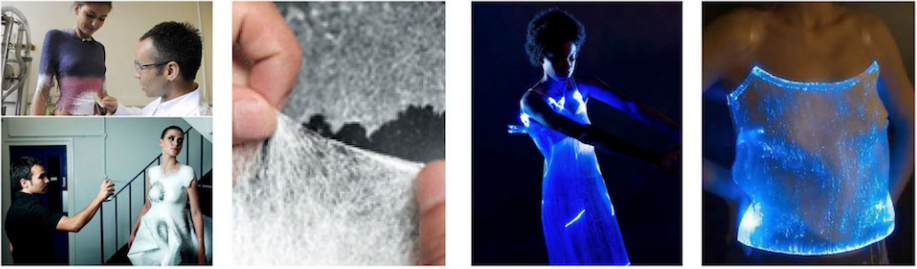


Fig.4 / spray dress Manuel Torres.Luminex textile dress

Light is a powerful modeler of space, something that adds to fantasy and the search for ever newer approaches to this material with the created fabric. Since four years, the company has been part of the St Gallen-based Forster Rohner Group, which has created a specialized work team for the design of textile materials. This year they were evaluated with the award “Tean awarded at Premiere Vision 2019”. This award was achieved only after four years of working in the group from the moment the company was sold to the Foster Rohner Group. Every year, 1200 different design projects are developed from their offices.

Artists or other textile designers who have taken this initiative to create hi-tech textiles with their personal initiative can be found at the various world textile fairs. Some names of fairs of this type are Premier Vision in Paris, New York and Turkey. And Pitti filati in Firenze Italy, and MIUNICA in Milan and Singapore. Companies display the textiles created during the year while designers design and get inspired to create their collections. Some interesting names of designers who also create textures through innovative technology are:

“Who knows how we will be dressed? Perhaps with a material that we will use to spray the body, perhaps the women will be dressed in colored gases adhering to their bodies, or in halos of light, changing color with the movements of the sun or with their emotions”

...Paco Rabanne 1969 .

This is a message that Paco Rabanne quoted in 1969, in a reflection on new materials and materials technology. Paco Rabanne is one of the first designers who experimented with different materials to create his clothes. He became a master of metal turning design. The reason why he chose metal in many of his works is the reflection that this material brings brilliance, which shows another social style, which was not there before. His clothes create another woman who wears this material that is strong in composition but at the same time transparent in texture.

Many designers have been inspired by his courage to experiment with the material, thus opening the way to an endless exploration with every type of material that could be processed.

Analyzing what you think of Paco Rabane, I didn't even reflect on the truth of some fantasies, which have now turned into reality. Yes, for example, we will dress in a material that sprays our body. Spanish designer Manel Torres has turned this material into reality. By creating a polymeric mixture, which turns into a fabric for the body. Together with Professor Paul Luckham from I Lodres College, they have turned into reality this fantasy of the 60s that Paco Rabane expresses in his imagination.

Companies like Luminex are among the first to experiment with optical fibers.



Fig.5 / ANREALAGE A LIGHT UN LIGHT collection KUNIHICO MORINAGA

The general characteristics of the fibers

Textile fiber is the set of fibrous products which, due to their structure, length, resistance and elasticity, have the property of joining, through spinning, into thin, tough and flexible threads which are used in the textile industry for manufacturing of yarns, which, in turn, through weaving, are transformed into fabrics.

Fibers are divided into two large categories: Natural and Chemical.

Natural: Natural textile fibers are those materials present in nature in the form of more or less long filaments, suitable for being transformed into yarn.

Natural fibers are also divided into Animal, Vegetable and Mineral

Animals: They are fibers made up of protein substances, and are wool, obtained from woolly animals such as sheep, camels, rabbits etc, and silk from the silkworm cocoon.

Plants: They are mainly composed of cellulose and are obtained from different parts of plants: from the stem, as in the case of flax, hemp and broom, from the seeds, as for cotton, and also from the leaves, as in the case of sisal.

Minerals: They are obtained from minerals such as asbestos.

Technofibres: Technofibres are also called (man-made fibres) as they are produced by man and constitute an important achievement of modern chemistry. And they are divided into two categories: artificial fibers and synthetic ones.

Artificial: They are obtained from natural products such as cellulose and protein. At its beginning it was called artificial silk because despite its different original nature, the fiber had the same shine as silk. It is developed through chemical processes.

Synthetic: They are obtained from chemical products derived from petroleum and reduced to filaments. They are distinguished based on the primary material which can be organic or inorganic and on the different manufacturing processes.

Fibers have different properties: morphological, chemical, physical, mechanical and physiological. Morphological characteristics, is the study of the internal and external structural form of organic elements. Geometry, shine, the hand

Chemical characteristics, is the study of the structure, composition, properties and transformability of natural and artificial organic and inorganic substances. Stability and resistance.

Physical mechanics, and the study of heat behavior, hygroscopicity.

Physiological is the study of resistance to bacteria and mold, allergies, the sense of heat and cold it transmits.

In this part I have tried to divide the fibers into the two large groups they belong to, the natural

ones and the artificial ones. As I also explained above, both natural and artificial fibers can be attributed the same characteristic properties but their origin is different. The possibility of creating fibers through the laboratory leads to a greater possibility of transformation and adaptability to create clothes in all contemporary shapes, obtaining the desired shape and softness or hardness.

Fibre tesili

Naturali	Tecnofibre
Vegetali	Artificial
Animali	Synthetic
Mineral	Inorganic

-Polymers

In artificial fibres, the polymer already exists in nature: it just needs to be extracted and processed. In synthetic fibres, however, the polymer is produced by man, generally by aggregating molecules of synthetic elementary monomers. This aggregation is called 'polymerization' and can occur according to two principles: polycondensation and polyaddition.

Polycondensation is a reaction sequence between monomers that are the same or different from each other, all equipped with at least two functional groups, capable of interacting by forming bonds that interconnect the single molecules in more or less long chains. Polycondensation polymers are polyester and nylon 66.

Polyadizine is a series of reactions between monomers that are the same or different from each other (comonomers) generally characterized by double bonds, i.e. by an internal energy charge capable of transforming under the action of particular activating substances called 'catalysts', in bonds between individual and individual, to form more or less long polymer chains. Polyaddition polymers are for example acrylic and polypropylene polymers.

Long before plastic and synthetic polymers existed, many years ago until life began on earth, nature used natural polymers to make life possible. Artificial polymers are the ones that have changed our lives nowadays.

Artificial fibres

Fibers that derive from subsequently modified natural polymers are called artificial; they can have a base of cellulosic or protein origin.

The first artificial fibre, industrially made and patented as 'artificial silk', used cotton linters that could not be used in spinning as raw material, taking them in cardboard boxes, bleaching them and treating them with a mixture of nitric acid and sulfuric acid. Hence the name 'Rayon Nitro', from the French 'rayed', to allude to its shine. Artificial fibers are: cellulosic and protein (the latter no longer in use today). Artificial protein fibers are fibers that are obtained starting from natural proteins of vegetal or animal origin, produced in continuous thread or in staple form.

Cellulosic fibers are viscose, cupro and acetate.

Viscose in continuous thread and staple. It is produced by wet spinning a cellulose derivative made soluble in water and caustic soda, drawn through a die, immersed in a coagulant bath, stretched to make it a continuous thread, then washed, bleached and collected. And a white, smooth, shiny, medium tenacity fiber does not melt and tends to swell in contact with water or humidity. It has a sweet, silky hand and a soft touch. In continuous thread it is used in silk fabrics and for the production of lining. As a staple it is generally used mixed with cotton or polyester for cotton-type fabrics.

Cupro

In continuous thread. It is produced from cotton linter. It is a fiber that has a silky shine, softness to the touch and smoothness; it is slightly more hygroscopic than cotton, does not become charged with static electricity, has good resistance to chemical agents, solvents and atmospheric

and biological agents. It can be dyed in very bright colors and is used in silk fabrics, high quality linings, linens, velvets, damasks, brocades, lampas and in the knitwear sector for the production of underwear items.

Acetate

It is a fiber composed of a cellulose ester from coniferous trees, dissolved with a solvent, extruded, spun into a continuous thread and dried. The acetate fiber has a shiny and brilliant appearance, and is light, soft, silky, antistatic, has a medium elastic recovery, has high tangibility and can be mass, yarn or piece dyed. It is also used mixed with all other fibres, natural and otherwise.

Synthetic fibres

Launched on the American market in 1935 and widespread in Europe five years later, synthetic fibers differ from artificial fibers because they are produced from compounds derived from petroleum which, when appropriately treated and transformed into polymers, become filamentous substances of a very complex nature, direct for different uses. In fact, their main characteristic is the high level of design aimed at the intended use. They are resistant, crease-proof, resistant to mold and moths, thermoplastic. They are produced in thread or staple. Upon qualitative analysis they appear perfectly regular, homogeneous, with a regular section. Synthetic fibers are polyamide or nylon, acrylic, polyester, polypropylene, polyvinyl, polyethylene, polyfluoroethylene, polyurethane.

Polyamide or Nylon

Patented in 1935 with the name 'Nylon' and widespread since 1940, they are fibers obtained from derivatives first of carbon and then of petroleum. They can be in continuous thread or in staple. They are tough and elastic, not very hygroscopic, resistant to ageing, crease-proof, thermoplastic, dyeable, unshrinkable, resistant to mould, microorganisms and moths, easy to maintain (washing, drying and non-iron). They have a smooth, shiny and light 'hand'. They are mainly used as a thread for silky (elastic) stockings, as a weave for waterproof fabrics, for icing fabrics, tulle, linings, velveteen, warp knitwear.

Acrylics (Acrylic)

They are obtained in staple and microfibre form from acrylonite derivatives: they are properly called "acrylic" if they contain acrylonitrile in a percentage greater than 85%, they are called "modacrylic" if they contain it in a lower percentage, generally between 50% and 60%. They are light, soft, voluminous fibres, unshrinkable when washed, resistant to light, atmospheric agents, mould, microorganisms and moths. They give the fabric a soft and warm "hand" to the touch. They are produced in cotton and wool types; special treatments enrich them with further properties, such as the addition of halogenated components which make the fiber fire-resistant, or the treatment used for the use of the fibers in external knitwear, pure or mixed with wool or other natural fibres. or synthetic. Mixed with cotton they are widely used in sweatshirts

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resistance to shrinkage and felting. In all blends they improve crease resistance, non-deformability and increase the lightness of the “hand”.

Polyester (Polyester)

Derived from a compound that is formed, by the elimination of water, between an acid and a glycol, they are fibers produced in continuous thread and staples. They are tough, elastic, resistant to air, heat, atmospheric agents, light, bleaches, with high thermal stability. Thermoplastic, crease-proof, resistant to mold and moths, they give the fabrics non-shrink and non-deformable characteristics, are easily washed, dry quickly and do not iron. They are lustrous fibers that allow brilliant dyeing.

Polypropylene

They are paraffin fibers obtained from the polymerization of propylene coming from petroleum. They are elastic, wear-resistant, stain-resistant, water-repellent, insulating and resistant to atmospheric agents. They can only be dyed through. They have a light, pleasant and quite bright “hand”.

Polyvinyl

They are fibers obtained from vinyl chloride. They are very resistant to combustion, thermosensitive, with good insulating power, difficult to dye and are easily charged with static electricity.

Polyethylenes

They are fibers obtained from the polymerization of ethylene. They are not hygroscopic and cannot be attacked by solvents and acids. They fear heat, a particular type is used for protective fabrics.

Polyfluoroethylenes

They are fibers insoluble in solvents and inert towards chemical reagents; they resist low temperatures, do not absorb water, resist heat, humidity and radiation and are used for highly sophisticated technical products.

Polyurethane (Elasten)

They are fibers produced in the form of elastomeric threads, that is, extensible, elastic, resistant to traction and bending. When the pulling force ceases, they return to their initial dimensions. They are often used mixed with other chemical or natural fibers to make them elastic and non-deformable. Covered with various types of threads wound in a spiral around the core of the thread, they are used in hosiery, knitwear and stretch fabrics.

Commercial terminology of some fibres.

Very light fabrics.

Btista, Cady, Calicot, Chiffon, Calico, Gauze, Muslin, Organza, Eggskin, Peachskin, Deerskin, Gingham, Poplin, Voile, Tulle.

Mottled effect fabrics

Iridescent, Chinè, Embossed, Moiré or Marbled.

Diagonal ribbed fabrics

Cannelé or cinnamon, Canneté, Denim, Drill, Faille, Gabardine, Levantina, Grisaglia, Piqué, Reps.

Light relief fabrics

Ottoman, Oxford.

Fabrics with an irregular feel

Bouclè, Crepe or Crespo, Frisè, Santung, Stretch.

Compact, robust and heavy fabrics.

Cloth, Covercloth, Cretonne, Felt, Loden, Panama, Tweed

Furry and soft fabrics

Duveline, Plush, Flannel, Fustian, Lenci, Cloth, Plaid, Patchwork, Plush, Shetland.

Other fabrics

Chenille, Chintzz, Ciré, Gobelin, Madras, Pied-de-poule, Plissé, Prince of Wales or Wales, Quilt, Sangallo, Tartan, Tricot.

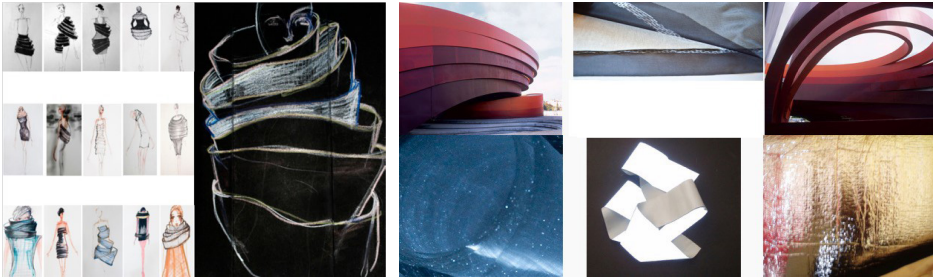


Fig.6 / Sketch by the author

Fig.7 / Materials used for the project

Optic fiber

Fiber optics allow light to go around corners, describe circles and curves, and bend. The term 'optical fibre' was used around 1956 to mean optical glass drawn into long, thin filaments, capable of transmitting electrical impulses and light. In the 1960s the new technology continued to be developed and implemented, physicists, chemists and engineers initially tried to conceive and produce a type of glass transparent enough to transport light over a distance of one kilometre. In 1970 Corning discovered that two types of glass were needed, allowing research to take a major step forward. Optical fibers are composed of two glass cylinders, core and cladding, with different refractive indices. The purity of the core allows the light to pass through the entire length of the cable without encountering obstacles, while the lower refractive index of the cladding prevents it from escaping. Very thin and lighter than copper, glass fibers today carry astonishing quantities of information, a further example of the use of glass in areas of technology that seem very far from its most obvious qualities. Technological advances in one field inevitably push related industries to evolve accordingly, super-thin glass for flat screens being one example. The increasing miniaturization of portable electronics requires ultra-thin borosilicate glass for greater transparency and better scratch resistance than the alternative, polymers. A characteristic of this type of glass is flexibility, which allows it to form into curved screens. It is widely used in touchscreen displays.

Spirals – and interactions between geometry and light

This inspiration came from a reflection between architecture and design, in which I found many points in common both in the creative concept and in the design.

Architecture is created to define a space. This also happens with clothing, it is created to define our body as our belonging. With the dress we create a story because through the dress we can define the period in which that clothing and above all those fabrics were used. This aspect is also part of the project in architecture defining a time. In buildings all new materials and new technologies are used to reduce the time of the construction process and to improve the appearance and strength of resistance, and the same thing is compared in clothing in which new technologies help to ensure that the garments are more comfortable, durable, pleasant and to obtain formal situations and in some cases very innovative aspects.

Furthermore, I searched for formal solutions with different effects through technical materials that interact with light, which develop with the spiral shape of the dress

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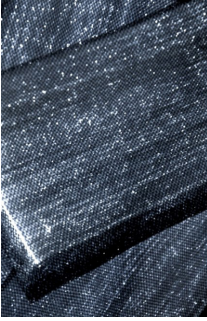


Fig.8 / Materials used for the project

Fig.9 / Dress created with Luminex fiber optic and neoprene



Fig.10 / Dress created with Luminex fiber optic

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03 - Resilience and Economic Sustainability

This subtheme addresses the social dimensions of urban sustainability. It investigates how social equity, inclusivity, and community engagement can be fostered in urban settings to ensure a sustainable and resilient future.

New Mobility Services and sustainable urban development: The common EU vision and the challenges for transport planning in Greek cities.

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DOI: 10.37199/c41000710

Abstract

The transport sector is one of the sectors that has been greatly influenced by the 4th Industrial Revolution through the development of New Mobility Services (NMS). NMS include innovative transport modes, such as autonomous road vehicles, and new concepts for serving mobility needs, such as Mobility as a Service, which are gradually being implemented in cities of Europe and worldwide. As part of the implementation of the European Union's (EU) Green Deal, the EU strategy for transportation and mobility sets specific ambitions and targets regarding NMS and their contribution to sustainable urban development. The core documents outlining the relevant EU strategy comprise the "Sustainable and Smart Mobility Strategy – putting European transport on track for the future" (COM(2020) 789 final) and "The New EU Urban Mobility Framework" (COM(2021) 811 final). In this context, the purpose of the current paper is the comprehensive description of the EU policy priorities for the implementation of NMS, deriving from the synthetic analysis of the information presented in the above-mentioned policy documents. The paper also aims at the discussion of challenges from the perspective of planning for urban mobility in Greek cities, such as the attachment to the private car for daily mobility, the necessity for data exchange and cooperation between stakeholders and the need for a long-term vision for sustainable urban development. Taking into account the overall policy objectives at the EU level and the challenges for pursuing these objectives to achieve the digital and green transition of Greek cities, the paper concludes with the suggestion of planning recommendations to integrate NMS into their urban transport system with a positive impact on their ongoing effort for the "sustainable mobility paradigm" shift. These recommendations mainly refer to the application of contemporary planning approaches, such as participatory planning, interdisciplinary cooperation and evidence-based planning, with focus on the issue of NMS implementation at the urban level. The issues discussed in the current paper directly concern planners and policy makers in urban areas of Greece, while they can be appropriately adjusted to the considerations of stakeholders in other cities. They can also provide the background to develop case-specific methodological processes to address the planning needs for the integration of NMS to a particular city.

Keywords: Autonomous road vehicles, City, Mobility as a Service, New Mobility Services, Sustainability

Introduction

Almost four decades since the publication of the milestone United Nation's (UN) report "Our Common Future", also known as the "Brundtland report" (World Commission on Environment and Development, 1987), sustainable development continues to be widely considered by scientists, policy makers and society as the main pathway towards progress and welfare. Nowadays,

the intensification of human activity, mainly due to industrialisation and globalisation, is having an unprecedented impact on climate change as well as on other environmental and socio-economic aspects, leading to potential existential threats and, thus, highlighting the need for global action towards sustainable development (IPCC, 2023). In this context, the 2030 Agenda for Sustainable Development, adopted by UN countries in 2015, sets out 17 Sustainable Development Goals (SDGs) with 169 targets and the corresponding measurable indicators (United Nations, 2015). In the same year, the “Paris Agreement”, i.e. a legally binding international treaty on climate change, was signed to agree on common policies for “limiting by 2050 global warming to below 2, preferably to 1.5, degrees Celsius, compared to pre-industrial levels” (United Nations, 2015). As cities account for approximately 56% of global population (more than 80% in developed economies), they play a key role in the implementation of policies against climate change and sustainability threats (United Nations, 2020). Urban mobility is responsible for a significant share of Green House Gas (GHG) emissions and other negative externalities. In the European Union (EU), more than 70% of the population resides in urban areas, which generate approximately 23% of all transport GHG emissions that correspond to a quarter of total emitted GHGs (European Union, 2023). Moreover, urban transport is responsible for 7 million premature deaths and over 600,000 road traffic fatalities annually (United Nations Economic Commission for Europe, 2020). Taking the above into account, the EU promotes sustainable urban mobility through the regular publication and communication of transport policy frameworks. The current transport policy framework, which will be further analysed in the present paper, is described in the “Sustainable and Smart Mobility Strategy – putting European transport on track for the future” (European Commission, 2020a) and “The New EU Urban Mobility Framework” (European Commission, 2021). These policy documents implement the overall EU strategic framework, i.e. the “European Green Deal” (European Commission, 2019), in the transport sector. The transport policy sets tangible mid-term and long-term targets, outlining “transformative” policies to address climate change and capitalising on new technologies and innovation to increase the overall sustainability of the urban transport system. In terms of technological innovation, the EU transport policy promotes the adoption of New Mobility Services (NMS) by cities in the context of a multimodal, user-oriented urban transport system, considering the environmental and social concerns (European Commission, 2020b). However, the adoption of innovation on urban mobility depends on the specific features of each city, related to preparedness, commitment, acceptance, and integration to the overall planning goals. The purpose of the current paper is the analysis of the current EU transport policy regarding the implementation of NMS in European cities and the development of a framework of the opportunities and challenges and the corresponding recommendations from the perspective of planning for urban mobility in Greece. The remainder of the paper is structured as follows: The following section aims at the review of literature with the aim of describing the trending concepts related to NMS as well as sustainable mobility and development. Then, the methodological approach of the current bibliographical research and analysis is presented. The findings of the research are presented and discussed in the next section. The final part of the paper is dedicated to conclusive remarks and prospects for follow-up research.

Literature Review

New Mobility Services

In the era of the 4th industrial revolution, the rapid progress in digital technologies, and namely in digital connectivity, artificial intelligence and flexible automation, is leading the development of innovative services in all sectors of socio-economic activity (World Economic Forum, 2018). The transport sector is one of the sectors that has been intensively affected by technological evolution. New Mobility Services (NMS) emerge as a potential game changer in the

field of urban mobility. According to (ITF, 2023), NMS can be broadly defined as “intraurban passenger mobility services and vehicles enabled by digital technology”. In this sense, NMS refer to new types of services, such as shared mobility and Mobility as a Service (MaaS), and new modes, such as Autonomous road Vehicles (AVs) and micromobility devices (Mubiru & West-erholt, A scoping review on the conceptualisation and impacts of new mobility services, 2024); (UITP, 2020). The following definitions can be used to clarify the different types of NMS. Shared mobility refers to the shared use of a travel mode to provide users with short-term access to the specific mode according to their current needs and preferences, without having to own the vehicle in use (Shaheen & Cohen, 2021). Different types of shared mobility services include the shared use of cars in terms of car-sharing, i.e. renting a car for a limited amount of time, ride-sharing (car-pooling), i.e. sharing a ride in a privately owned car with other passengers, and ride-hailing, i.e. hiring a personal driver and car for a specific trip. Shared mobility services may accordingly apply to bicycles, e.g. bike-sharing, and micromobility (Guyader, Friman, & Olsson, 2021); (FHWA, 2016). Different definitions can be found in literature regarding Mobility as a Service (MaaS). A comprehensive definition in the framework of the current paper refers to the user-oriented, on demand, “door-to-door” mobility service that combines different (shared and public) transport modes by different operators through a common digital platform, offering the ability to the user to remotely plan, book and pay for the trip (UNECE Inland Transport Committee, 2020); (MaaS Alliance, 2017); (UITP, 2019). Autonomous road vehicles (AVs) can be defined as self-driving vehicles with technological equipment, such as telecommunications and sensors, that enable driving operations without the driver’s intervention (Li, Huang, Liu, Zheng, & Wang, 2016); (Gordon & Lidberg, 2015). Similar concepts that are often used in EU policy are: Cooperative, Connected and Automated Mobility (CCAM); and Connected and Automated Driving (CAD). The SAE levels of automation are usually used as a common reference to rank the automated driving technologies (SAE International, 2021). There are 6 levels, starting from Level 0 (no driving automation) to Level 5 (complete driving automation under all conditions). Autonomous vehicles belong to level 4 and higher. It should be highlighted that AVs are currently tested for different purposes and scenarios or operated under controlled conditions, while their wide-scale implementation is estimated to be feasible by the end of the decade (ERTRAC Working Group “Connectivity and Automated Driving”, 2019). There is no internationally recognised definition of micromobility, while the term usually refers to light vehicles for personal travel in low-speed (UNDP, EU4Climate, 2023). The micromobility devices can be human or electric (fully or partially motorised) and may include bicycles, e-bikes, scooters, e-scooters, segways, onewheels etc. (Price, Blackshear, Blount, & Sandt, 2021).

Sustainable mobility and development

According to the European Union Council of Ministers of Transport (2001), a sustainable transport system “allows the basic access and development needs of individuals, companies and society to be met safely and in a manner consistent with human and ecosystem health, and promotes equity within and between successive generations.” Sustainable mobility is achieved through “the provision of services and infrastructure for the mobility of people and goods—advancing economic and social development to benefit today’s and future generations—in a manner that is safe, affordable, accessible, efficient, and resilient, while minimising carbon and other emissions and environmental impact” (UN Secretary General’s High-Level Advisory Group on Sustainable Transport, 2016). In other words, sustainable mobility is closely linked to the well-known parameters of sustainable development, i.e. environment, society and economy, due to the fact that the transport system provides physical access to locations of socio-economic activity through the transportation of people and goods, a process which generates socio-economic and environmental impacts (Figure 1). The EU strategic planning frame-



Fig.1. The link between sustainable mobility and the parameters of sustainable development (source: own elaboration)

work for urban mobility, i.e. the Sustainable Urban Mobility Plan (SUMP), comprises the tool for integrated planning in terms of urban sustainability (Rupprecht Consult (ed.), 2019). The aforementioned 2030 Agenda for Sustainable Development acknowledges the relationship between mobility and sustainable urban development by defining, among others, the SDG11: “Sustainable Cities and Communities” (United Nations. Department of Economic and Social Affairs. Sustainable Development, 2023), with targets which are directly or indirectly related to the transport system (Table 1). For example, target 11.2 refers directly to the characteristics of sustainable mobility, as presented in Figure 1, while targets 11.b and 11.3 refer to integrated policy making and planning for sustainable cities, which includes urban mobility policies and plans. Target 11.6 focuses on the environmental impact of cities, which is affected by urban mobility. Targets 11.7 and 11.a cover aspects of intra-urban and extra-urban accessibility respectively, which significantly depend on the transport system. Finally, regarding target 11.4, spatial accessibility and the mobility of people and goods facilitate the exchange of ideas and the interaction between cultures, while the development of transport networks may create pressures on the assets of cultural and natural heritage.

Methods:

Methodological steps

The methodology of the current paper comprises the following steps:

- a. Review and analysis of the current EU strategic framework on transport with focus on urban mobility
- b. Overview of the implementation of the corresponding strategic priorities in the Greek planning practice
- c. Development of a framework of opportunities, challenges and planning recommendations.

Review of EU strategic documents and overview of Greek planning practice

The review of the main policy documents regarding transport and urban mobility for the current EU programming period (2021-2027) is conducted with focus on the implementation of NMS and their potential contribution to sustainable urban development. In specific, the “Sustainable and Smart Mobility Strategy – putting European transport on track for the future” (COM(2020) 789 final) and “The New EU Urban Mobility Framework”

	Code	Target
By 2020	11.b	Increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change and resilience
By 2030	11.2	Access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons
	11.3	Enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries
	11.6	Reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management
	11.7	Provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities
Constant pursuit	11.a	Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning
	11.4	Strengthen efforts to protect and safeguard the world's cultural and natural heritage

Table 1. The transport related targets of SDG11: “Sustainable Cities and Communities” (source: own elaboration from (United Nations. Department of Economic and Social Affairs. Sustainable Development, 2023)

(COM(2021) 811 final) are analysed as the strategic framework for the implementation of the “European Green Deal” (COM(2019) 640 final) in the field of transport and mobility. Moreover, a comprehensive overview of the adoption of EU policy priorities in recent SUMP of Greek cities is provided to assess the implementation of NMS in the local sustainable mobility policy. Main sources to collect information are the CIVITAS SUMP-UP registry (CIVITAS, 2023) (only one Greek SUMP was registered) and the SUMP Observatory of the Sustainable Mobility Unit of the National Technical University of Athens (Sustainable Mobility Unit, National Technical University of Athens, 2023).

Framework of challenges and opportunities and planning recommendations

Based on the above review, the second part of the methodology comprises an attempt to propose a comprehensive framework which presents the challenges and opportunities for the implementation of NMS in Greek cities and the corresponding planning recommendations to address the challenges and capitalise on the opportunities. The framework is structured under specific criteria that cover main aspects of sustainable urban development, i.e. citizen and society; spatial development; and natural and built environment. The challenges stem from the conceptual approach of the Urban Mobility Innovation Index (UMii, 2021). The planning recommendations refer to the appropriate adoption of the tools and approaches suggested by the SUMP guidelines (Rupprecht Consult (ed.), 2019).

Results and discussion:

The role of NMS in the EU policy for transport and mobility

As mentioned above, the EU strategy for sustainable development in the current Programming Period (2021-2027) is described in the “European Green Deal” (COM(2019) 640 final). The purpose of the Green Deal is to renew the European Commission’s commitment to tackle climate change and to implement the “2030 Agenda” and the SDGs. The objectives of the specific strategy are presented in respect to the corresponding dimension of sustainable development in Table 2. The strategy outlines specific priorities for each sector, including the priority for the transport sector to accelerate the “shift to sustainable and smart mobility” (European Commission, 2019). In order to support the implementation of the Green Deal in the transport sector, the “Sus-

Environment	Society	Economy
<ul style="list-style-type: none"> • No net GHG emissions in 2050 • Protect, conserve and enhance the EU's natural capital 	<ul style="list-style-type: none"> • Fair and prosperous society • Protect the health and well-being of citizens from environment-related risks • Just and inclusive transition to decarbonization 	<ul style="list-style-type: none"> • Modern and competitive economy • Decoupling economic growth from resource use

Table 2. The European Green Deal main objectives (source: own elaboration from (European Commission, 2019))

Environment	Society	Economy
<ul style="list-style-type: none"> • Combination of policy measures set out in this strategy can deliver a 90% reduction in the transport sector's emissions by 2050 	<ul style="list-style-type: none"> • Transport system resilience against future crises (such as Covid-19) • Mobility available and affordable for all (incl. rural and remote regions, persons with reduced mobility and persons with disabilities) • Good social conditions, reskilling opportunities and attractive jobs in the transport sector 	<ul style="list-style-type: none"> • Transport growth coupled with greening mobility
<ul style="list-style-type: none"> • Digitalisation for seamless and more efficient transportation 		

Table 3. The Smart and Sustainable Mobility Strategy main objectives (source: own elaboration from (European Commission, 2020a))

tainable and Smart Mobility Strategy – putting European transport on track for the future” (COM(2020) 789 final) delivers a detailed roadmap to promote the different aspects of sustainable and smart mobility. The objectives of the Sustainable and Smart Mobility Strategy in respect to the dimensions of sustainable development are presented in Table 3. The objective of digitalisation in Table 3 is considered a “horizontal” objective as its main purpose is to accelerate the overall shift towards more sustainable transport systems. More specifically, the Strategy highlights the need for “transformational” policies with time-bound target setting, as presented in Figure 2. The measures to achieve those targets are categorised into three fields of priority, i.e. zero-emission mobility; seamless, safe and efficient connectivity; and resilient and inclusive single European transport area. Each of the fields of priorities contains measures concerning different “flagship areas”. These measures comprise proposals for legislative and regulatory actions, standardisation and technical specifications, thematic studies, roadmaps and action plans, governance tools, financial tools, cooperation initiatives and partnerships, as well as research and innovation opportunities through the current R&I Framework Programme (Horizon Europe). The strategy mentions that “Cities are and should ... remain at the forefront of the transition towards greater sustainability” and highlights the role of new and shared mobility solutions, such as MaaS, towards this direction (European Commission, 2020a). The implementation of the Sustainable and Smart Mobility Strategy in the context of urban mobility is the scope of the “New EU Urban Mobility Framework” (COM(2021) 811 final). Its purpose is the formulation of the appropriate policies for the “transition to safe, accessible, inclusive, smart, resilient and zero-emission urban mobility through active, collective and shared transportation” (European Commission, 2021). The priorities of the Framework comprise:

1. TEN-T urban nodes
2. Sustainable Urban Mobility Plans (SUMP) and mobility management plans
3. Sustainable urban mobility indicators
4. Public transport services
5. Active transport and micromobility
6. Freight logistics and last-mile delivery

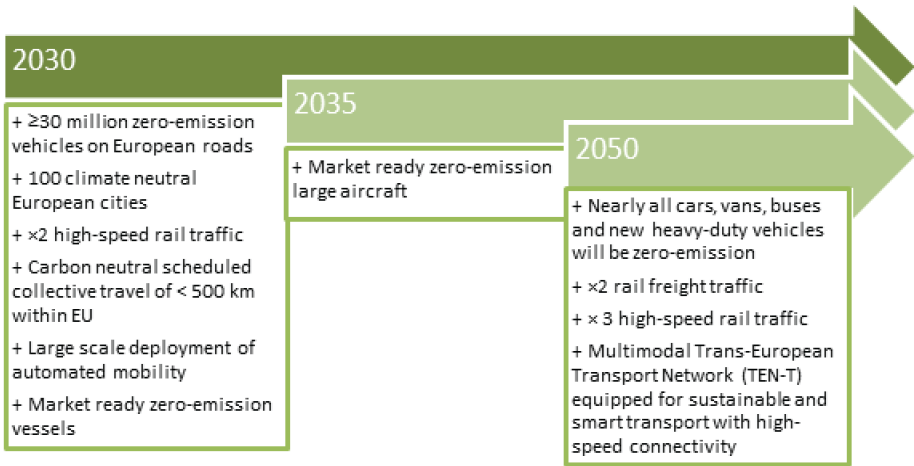


Fig. 2. Targets of the Sustainable and Smart Mobility Strategy (source: own elaboration from (European Commission, 2020a))

7. Digitalisation and new mobility services

8. Climate neutral cities

The above priorities and respective policies and measures are discussed below from the perspective of the current paper, i.e. the implementation of NMS to promote sustainable urban development. The New EU Urban Mobility Framework highlights that the public transport system continues to play the key-role for affordable and inclusive transport, environmental sustainability, enhancement of territorial cohesion and creation of jobs. However, there has been relatively limited development over the last years and further disruption in the period of the pandemic. The sustainable recovery of the urban public transport system can be achieved, among other measures, through the development of appropriate MaaS services with public transport operating as the backbone of collective mobility by 2030 (Figure 3). This can be facilitated by the implementation of new technologies, increased funding and policy support through the aforementioned SUMPs. In contrast to the public transport system, the pandemic favoured active transport and micromobility due to social distancing and the need for outdoor activity. According to the New EU Urban Mobility Framework, micromobility can complement public transport to provide attractive, competitive and low emission solutions for “door-to-door” trips. It is worth mentioning that a SUMP Topic Guide on the safe deployment of micromobility devices for planners and local authorities has been recently developed (European Platform on Sustainable Urban Mobility Plans, 2021). In this context, the Framework stresses the need for specific rules on the safety of micromobility devices. The Framework explicitly refers to the role of digitalisation and data sharing for the effective implementation of NMS, capitalising on the technological advancements of Industry 4.0. In terms of planning for the integration of these new and potentially disruptive services into the urban transport system, the perspective of cities as fields of experimentation is suggested, through participatory activities, such as living labs, and through innovative tools, such as digital twins. Moreover, the Framework aims for the realisation of sustainable Connected, Cooperative and Automated Mobility (CCAM). Specific topics under the Horizon Europe R&I Framework Programme are directed towards this purpose. Finally, transport innovation is promoted to support the “100 Climate-Neutral and Smart Cities by 2030” mission. The particular mission is one of the five EU missions for the current Programming Period, which essentially comprise coordinated actions, including research and

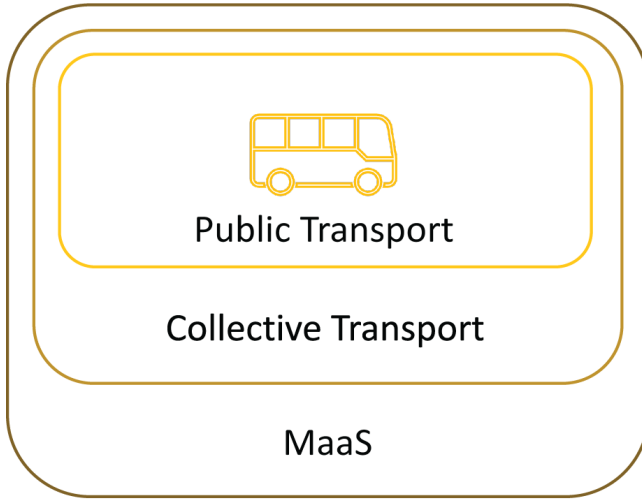


Fig. 3. Public transport as the backbone of collective transport in EU cities according to the New EU Urban Mobility Framework (source: own elaboration from (European Commission, 2021))

innovation, funding, policy, regulation, information sharing and stakeholder mobilisation, to deliver 100 smart and carbon neutral cities across the European Union (European Commission, 2021). In contrast to the public transport system, the pandemic favoured active transport and micromobility due to social distancing and the need for outdoor activity. According to the New EU Urban Mobility Framework, micromobility can complement public transport to provide attractive, competitive and low emission solutions for “door-to-door” trips. It is worth mentioning that a SUMP Topic Guide on the safe deployment of micromobility devices for planners and local authorities has been recently developed (European Platform on Sustainable Urban Mobility Plans, 2021). In this context, the Framework stresses the need for specific rules on the safety of micromobility devices. The Framework explicitly refers to the role of digitalisation and data sharing for the effective implementation of NMS, capitalising on the technological advancements of Industry 4.0. In terms of planning for the integration of these new and potentially disruptive services into the urban transport system, the perspective of cities as fields of experimentation is suggested, through participatory activities, such as living labs, and through innovative tools, such as digital twins. Moreover, the Framework aims for the realisation of sustainable Connected, Cooperative and Automated Mobility (CCAM). Specific topics under the Horizon Europe R&I Framework Programme are directed towards this purpose. Finally, transport innovation is promoted to support the “100 Climate-Neutral and Smart Cities by 2030” mission. The particular mission is one of the five EU missions for the current Programming Period, which essentially comprise coordinated actions, including research and innovation, funding, policy, regulation, information sharing and stakeholder mobilisation, to deliver 100 smart and carbon neutral cities across the European Union (European Commission, 2021).

Assessment of the implementation of NMS in Greek cities based on the overview of SUMPs

In order to assess the progress in the implementation of NMS in Greek cities, an overview of the corresponding SUMP was conducted, using the CIVITAS SUMPS-UP registry and the SUMP Observatory of the Sustainable Mobility Unit of the National Technical University of Athens. The SUMPs were considered as a valuable source of information because they comprise the main strategic plans for sustainable mobility in Greek cities with a long-term vi-

Perspective	Opportunities	Challenges
Citizens and society	<ul style="list-style-type: none"> • Increase mobility alternatives, and decrease private mode dependency and personal travel costs • Improve accessibility for people with mobility impairments, limited budget and vulnerable users in general • Provide attractive and dynamic service to user-oriented mobility needs • Offer new opportunities for the local digital and green economy 	<ul style="list-style-type: none"> • Establish governance strategy and attract investment with a clear citizen/society-oriented perspective • Develop adequate infrastructure for digital connectivity and physical access for "door-to-door" traveling • Access to data and know-how for the implementation of new technologies • Increase awareness, control and incentivisation to change the current "mobility culture", such as the attachment to the private car
Spatial development	<ul style="list-style-type: none"> • Enhance spatial accessibility and connectivity of under-serviced areas (e.g. areas with low coverage by public transport) • Create new connections and interactions between areas, leading to new sustainable development opportunities 	<ul style="list-style-type: none"> • Ensure that the NMS business models for under-serviced areas are economically viable, resilient and competitive • Exchange data and information and establish cooperation between the transport and other sectors of the local economy
Built and natural environment	<ul style="list-style-type: none"> • Reduce congestion in central areas, and cut emissions, fossil fuel dependency and energy consumption • Improve the quality of urban environment, and free public space for sustainable urban development 	<ul style="list-style-type: none"> • Manage the transition to NMS and the changes in travel patterns and the potential increase in travel demand, due to improved mobility services • Establish integration and complementarity between different planning jurisdictions

Table 4. Opportunities and challenges from the adoption of NMS in Greek cities (source: own elaboration)

sion which covers the current EU Programming Period and its policy priorities for urban mobility. According to national law (N. 4784/2021), all urban areas with population more than 30,000 were obliged to conduct a SUMP by 2022, with a time horizon of at least 10 years. The current overview is based on the web-search of the SUMP of 76 municipalities in Greece. The search showed that the availability of information on the internet depends on the case and ranges from isolated announcements to detailed SUMP websites (as it is foreseen by the national law) with specific deliverables and dissemination material. Each SUMP refers to the specific mobility and accessibility challenges of each city, considering its size, location, spatial features and socio-economic development goals. Despite the different contexts, all SUMP aim for boosting sustainable urban development by decreasing private car dependency and promoting active and public transport. Furthermore, a common characteristic of many Greek SUMP is that they include proposals for shared micromobility systems. A closer reading of most of the available SUMP suggests that the proposed measures to promote shared micromobility are somewhat vague, without explaining the complementarities with the public transport system nor the safe integration to the transport network, as suggested by the EU policy. Moreover, reference to MaaS is scarce, while there is no coverage of the issue of autonomous mobility. Overall, the current SUMP of Greek towns and cities cover some aspects of the EU vision to promote urban sustainability through NMS, but not in a systematic way and without fully adopting the different dimensions of the relevant EU policy.

Framework of opportunities, challenges and planning recommendations

If appropriately adapted to the local conditions, trends and aspirations, new technologies and innovative approaches can contribute towards addressing the problems of mobility and accessibility and accelerating the shift to urban sustainability. On the other hand, the adoption of NMS may not be so effective in the long run, if based on general recommendations without specific measures to ensure the acceptance and support by the public and stakeholders, the integration and contribution to the existing infrastructure, services and operations and the assessment of impacts on sustainable urban development.

According to the conceptual approach of the Urban Mobility Innovation Index 2021 (UMii, 2021),

the challenges for the adoption of innovation in urban mobility can be categorised into three types:

- Readiness, in terms of the clear strategic vision for the future, the setting of tangible goals and the institutional and operational capacity, as well as the data and knowledge base, to reach them.
- Deployment, i.e. the actual implementation of innovation by addressing regulatory obstacles, attracting investment and engaging the public and stakeholders in participatory actions.
- Liveability, in terms of the assessment and evaluation of the impacts on mobility and accessibility, socio-economic development and environmental sustainability.

The challenges for the integration of NMS into the transport system of Greek cities is based on the above conceptual framework. The opportunities and challenges are described in Table 4, from the perspective of: citizens and society; spatial development; built and natural environment.

In order to address the above challenges and take full advantage of the opportunities offered by NMS, recommendations are presented below, deriving from the current transport planning trends, as well as from the SUMP guidelines (Rupprecht Consult (ed.), 2019). In terms of public participation, most of the implemented SUMPs in Greece focus on public consultation for the analysis of the current situation and the collection of opinions regarding the planned interventions. A stronger participatory approach in all SUMP stages, including the adoption of specific roles and responsibilities in the implementation, monitoring and evaluation of the suggested policies and measures is proposed to ensure that the citizens, as end-users, and the stakeholders share the city's vision for NMS and engage to its realisation. Towards this purpose, inclusiveness of different social groups should be ensured by developing a systematic participatory planning approach and by combining physical and digital participatory tools, as suggested by the international practice (REA, Aalto University, 2024); (Staffans, Kahila-Tani, & Kytta, 2020). Supported by stakeholders and users, city authorities should be able to design more ambitious and innovative strategies, considering the whole array of available NMS solutions and capitalising on their competitive advantages. However, the potential disruptions and uncertain impacts related to NMS (Mubiru & Westerholt, 2024), require the development of an action plan for sustainable mobility, which would support the SUMP implementation. This action plan should ensure the effective coordination of planning, funding, application and evaluation processes in the context of the balanced development of the multimodal urban transport system. It should also account for the complementarities between the national, regional and local planning institutional and planning frameworks in all related disciplines, such as mobility, environment, climate, energy, land use, welfare, production, commerce etc. Local knowledge and expertise should be fully incorporated into the mobility plans by involving, for example, initiatives for local mobility management plans and contributions by the scientific community, such as the local research institutes and university departments.

Conclusions:

The current paper provides a comprehensive analysis of the strategic orientations of the EU regarding NMS and urban mobility. Moreover, it assesses the adoption of NMS by Greek cities, according to their SUMPs, and highlights the related opportunities and challenges. Finally, a series of planning recommendations are proposed to enhance the current practice of the Greek SUMPs. The promotion of sustainability has been a constant goal of development policies for more than three decades. Cities, attracting a great share of population and socio-economic activity, generate a significant impact on the social, economic and environmental aspects of sustainability, while they play a pivotal role in the implementation of policies to accelerate the shift towards environmentally friendly, low-carbon, energy efficient and socially inclusive development. The acceleration of the "sustainability shift" is nowadays considered necessary, due to the emergence of the climate crisis, and possible, due to the technological advancements of Industry 4.0. The urban transport system is one

of the sectors that receive the increasing attention of policy makers, with the integration of new and innovative mobility services perceived as the means to develop effective, affordable and low-emission travel choices for all. The augmented focus of EU transport policy on NMS is evident from the analysis of the “Sustainable and Smart Mobility Strategy” and the “New EU Urban Mobility Framework”. The implementation of the corresponding policy priorities at the urban level in EU should be described in the SUMP, which comprise the strategic planning frameworks of cities regarding transportation and mobility. In the case of Greece, the overview of the SUMP shows a strong commitment to enhance sustainability, as well as to adopt NMS, mainly in the form of shared micromobility. However, there are persisting challenges for the adoption of mobility innovation in Greek cities. These challenges can be summarized into conflicting policies and measures, gaps in infrastructure, data and governance, limited know-how and resources, poor citizen awareness and low interaction with the local community. These challenges can be considered as barriers for the effective integration of NMS in the multimodal urban transport system and the full exploitation of their potential. The examined SUMP also lack ambition in terms of taking advantage of all possible NMS solutions which are currently practiced or developed worldwide. The starting point for addressing those challenges from the planner’s perspective is the stronger engagement and commitment of the local community in terms of stakeholders, users and experts. Stronger public participation though appropriately designed physical and digital participatory planning tools can contribute to this purpose. In addition, a detailed action plan may support the implementation of the SUMP by organising and coordinating priorities, jurisdictions and funding opportunities. The results from the current analysis can be used by local authorities to increase their understanding of the key-issues regarding the advantages and challenges related to NMS and their potential to promote sustainable urban development. Based on the proposed background, similar analyses can be conducted in other countries in Europe and other parts of the world, as both the enhancement of sustainable urban development and the evolution of NMS are global concerns. As a follow-up research, the analysis of challenges, opportunities and recommendations for the implementation of NMS in Greek cities is planned to be validated and enhanced through surveys with the participation of local authorities, stakeholders, users and experts. The contribution of local authorities and experts will be also sought to determine the components and design the methodology for the proposed action plan.

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Planning for Resilience – Study of a social housing model for Ras Al Khaimah, UAE

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DOI: 10.37199/c41000711

Abstract

Housing, in general, addresses technical, social, political, and economic issues more than any other building type. However, there is a recent emphasis on a bigger picture with more intention placed on implementing sustainable planning aspects of neighborhoods and communities' level as well as on the individual house's level. Considering that from 10 to 20 percent of the total urban area is usually occupied by social housing, urban resiliency is currently in the center of debate about the provision of social housing in order to achieve the long-term sustainable development goals. United Arab Emirates (UAE) government considers housing as one of the most vital sectors of the country's economy that safeguards a successful sustainable urban development. One the main goals of the country is to provide its citizens with quality social housing. Hence, new, more resilient models of neighbourhood planning are introduced in replacement to the conventional models of urban forms. However, these programs address country's citizens only despite the fact that the demographics of the country shows the ratio of Emirati population to Expat 11,48% to 82,52% respectively. Based on this perspective, this study discusses the requirements of resilient social housing that are adaptable to the local environment, by proposing a social housing model for expat population of the country. Through observation of expat social housing conditions and of existing social housing programs for Emiratis population in Ras Al Khaimah, authors design criteria for environmentally/culturally adaptive social housing. The observation phase of the research is followed by an experimental one, during which the authors suggest a social housing model for Expat population that satisfy the set criteria. As a result of the research, model of social housing that considers the environmental, economic, and social aspects of sustainability is suggested to comply with Emirate's strategy to enhance the sector of social housing. By this research, the authors comply with the Emirate's strategy to enhance social housing and inform all decision makers and responsible stakeholders about the importance of better individual housing unit-neighbourhood-city planning that will result in sustainable communities and social equity.

Keywords: *Autonomous road vehicles, City, Mobility as a Service, New Mobility Services, Sustainability*

Introduction

Resilient and inclusive social housing is a significant indicator that measures a community's and country's social welfare. The definition, size, scope, target population and provider of social housing may differ from country to country, however most of the social housing programs target low-income members of the community. Countries establish their eligibility for social housing criteria based on clientship, household's income and its current living circumstances. Yet, these criteria – target population and eligibility - differentiate social housing programs from country to country. Despite the above listed differences, social sustainability, social mixing and inclusivity unites social programs goals of different countries as this is a key to achieving social and economic sustainability (OECD (2020)). The growing concerns around social segregation and social stability calls for mak-

ing the cities more inclusive, safe, resilient through the revision of social housing programs and policies. The aims of these revisions are to accelerate social sustainability and mitigate socio-economic challenges and spatial segregation between different community groups and rectify social imbalances and offer equal opportunities for people of different social groups (Janssen, et al, 2021). Social housing is an important sector of the economy that ensures sustainable urban development, and therefore, the provision of quality social housing is one of the main goals of the United Arab Emirates (UAE) government (Ibrahim, 2020). The sustainability agenda of the country's government is reflected on social housing programs and cities/neighbourhoods planning, wherein conventional design and planning methods are replaced by more sustainable ones (Ahmed, 2017). Green building rating systems such as local ESTIDAMA (The Pearl rating system launched by the Department of Urban Planning and Municipalities in Abu Dhabi in 2010) and LEED (U.S. Green Building Council) help in achieving more sustainable cities, neighbourhoods and housing communities across the country and reduce the carbon emissions of the country (Ibrahim, 2020). The country's current housing programs target citizens only, though, according to Janssen (2021), social sustainability is defined as consideration and enhancement of wellbeing of all current and future members of a community. Therefore, this article focusses on social sustainable development as it relates to housing programs in Ras Al Khaimah (RAK). RAK is the northern Emirate of the seven Emirates in United Arab Emirates (UAE). It is projected that the population of this Emirate will reach 603,000 residents by 2025 (Farrington, 2015). In recent years, there has been an influx of expatriates choosing to live in RAK not only due to low cost of living compared to the other emirates, but also to the work opportunities offered based on the economic development experienced in this emirate and whole UAE. Given that a significant portion of the city's population consists of foreigners and expatriates, it is crucial to address their housing needs, particularly in terms of affordability. This could be integrated into the Emirate's social housing strategy. Bruen et al (2013) maintain that affordability and sustainability have become essential considerations in the international discourse on development, especially concerning housing solutions for the blue-collar workers in developing nations. This paper will argue that addressing the housing requirements of Ras Al Khaimah's residents, including expatriates, is essential to meet the long-term sustainable development goals in the Emirate. Achieving these long-term sustainable development objectives, will necessitate prioritizing sustainability and resilience in the Emirate's housing programs for the local as well as for the expats. In planning for resilient and inclusive housing, the three main sustainability measures – social, economic and environmental, must be considered (Alves, 2020). The criteria, in this case, for measuring social, economic and environmental sustainability of a housing are: ability to a) ensure equitable access, b) economic/financial inclusion to all community members, and c) conserve resources during its entire life-cycle (construction, maintenance and operation) and produce a low carbon footprint. In order to meet social sustainability requirements, a city planning system considers a socially efficient mix of land uses, equitable distribution of land for housing, and adequate provision of affordable housing (Mekawy, 2014). Based on the above-described perspective, this study discusses the requirements of resilient social housing that are adaptable to the local environment, by proposing a social housing model for expat population of the country taking RAK as a case study. Through the overview of existing housing programs and study of expat social housing conditions, authors design criteria for resilient and inclusive social housing that is also environmentally/culturally adaptive. As a result of study, authors suggest a model of social housing that considers social aspects of sustainability.

Literature review - review of social housing programs in rak:

Housing is one of the significant sectors in the United Arab Emirates. The visionary leaders of this economically developed country recognized the importance of providing affordable housing for the citizens, ensuring that every Emirati, regardless of their economic status, have a decent place to call home. As the country continues to flourish, so does its commitment to social welfare to build resilient and vibrant communities. Under the directives of His Highness Sheikh Mohamed bin Zayed Al Nahyan, the UAE President, UAE's Social Welfare Programs of low-income population have been restructured to align with the leadership visionary and commitment to "make the UAE one of the best countries in terms of supporting the community and quality of life" (WAM, 2022). Housing allowance is one of the main social benefits to be granted to low-income citizens who are eligible to social welfare, according to Hessa bint Essa Buhumaid, the UAE Minister of Community Development. As early as the unification of the country initiated, the government began social housing initiatives that focus on providing basic dwelling to low-income families to shelter them from the harsh desert environment (Maclean, 2016; Mohamed et al, 2023). These initiatives laid later the foundation for more ambitious projects (Al-Mansoori, 1997). The governmental social housing programs encompassed three main categories: Firstly, pre-built housing units which were provided free of charge to low-income citizen groups. Secondly, financial grants were offered to citizens to build their own homes on designated plots of land. Thirdly, long-term loans, extending up to 25 years with minimal interest rates, were provided to citizens with the financial capability. The main objective of these housing programs was to offer a well-designed healthy environment for every Emirati, regardless of their background and location, as a gesture from HH Sheikh Zayed, the founder of UAE (Assi, 2023). The early public housing projects, that fell under the first category, were predominantly a single-family unit on a sufficient piece of land. Example of this social housing projects is the Shabiyat Housing in Ras Al Khaimah implemented in 1973. Assi (2023) maintains that initially, the Shabiyat dwelling units were compact and constructed primarily to accommodate a large number of people during emergencies. These planned communities included equal medium-sized plot of lands that contained similar housing design layouts. As per data gathered by the Ministry of Public Works, UAE, this housing program initiative began with implementing moderate size housing units of approximately 108 square meters situated on 900 square meters plots of land. By the 1990s, these units were expanded to a two-story housing layout of 367 square meters, located on plots of 1,620 square meters (Ahmed, 2011). As the UAE embraced modernity and urbanization, the scope of social housing expanded. Innovative architectural designs emerged, blending traditional elements with contemporary aesthetics to create sustainable and culturally relevant dwellings. These new developments were not just about providing shelter but about nurturing a sense of belonging and community spirit. Thus, the government also provides housing options for the Emiratis under the above-mentioned second category. Examples of these programs are: the Sheikh Zayed Housing Program (SZHP), the President's Initiative (PI) (Elmenghawi & Cazacova, 2023). SZHP, which was established in 1999, is the main federal association responsible for providing public housing across all the country's Emirates (Sheikh Zayed Housing Program, 2020). Subsequently, each Emirate has established its own local public housing agency to enhance housing availability for Emirati citizens, the Sheikh Saud Housing Program is the local initiative of social housing programs for the Emirate of Ras Al Khaimah (Agrawal, 2018; The Sheikh Saud Housing Program, 2019). With the increased demand on public housing due to growing population and limitation of land available for building such projects, new models have been introduced. The government offered multi-family housing as apartment buildings. Examples of such housing models are found in Diba Al Hosn in Sharjah and Al Ghurfah in Al Fujairah. Shareef and Ahmed (2023) argue that while the design of these two multi-family housing models considered some of the Emirati life-style's requirements, the degree of attainment of social sustainability in these medium rise apartment buildings is

not fully examined. Their study concludes by identifying the deficiencies in the social sustainability aspects of contemporary multi-family public housing designs in the UAE. It proposes a comprehensive framework of social sustainability principles and indicators that could effectively address the social sustainability aspects of vertical public housing for Emiratis (Shareef & Ahmed, 2023).

Methods:

With the aim of identifying the requirements of resilient social housing and proposing a residential unit for the expat population of the country, authors apply two different research methods – qualitative and experimental. Qualitative method is used for: a) identification of requirements for resilient social housing; b) existing social programs study. Wherein, a) is executed through literature survey, and b) through literature survey. For the experimental method of this research, authors are modelling a social housing unit based on the requirement identified by qualitative method and evaluates its social, economic and environmental sustainability. This research however concentrates on social sustainability performance only, and the other two components will be evaluated in the future research. Social sustainability of the proposed model is evaluated based on two main criteria (tangible and intangible) that are given in the below diagram.

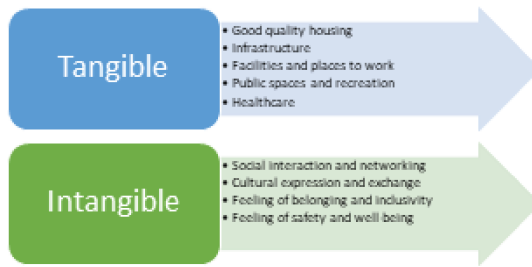


Fig. 1. Criteria for evaluating housing social sustainability.

Results and discussion - social housing modelling:

The proposed model of social housing targets inclusively all groups of RAK community and aims to revolutionize affordable housing through inventive modular building systems, to cater for pressing need of accessible living spaces within the community. Using the efficiency and flexibility of modular architecture, this model optimizes land use (that is so precious in the UAE) and spaces use while maintaining quality and cost. Traditional building methods frequently fail to keep up with increased demand for inexpensive housing, resulting in inadequate living circumstances for many people and families. Modular construction offers a range of benefits such as cost reduction through streamlined building processes, faster construction times, and reduced prices. This means that housing can be deployed rapidly, thus raising the supply of inexpensive houses to meet increasing demand. As the housing model is modular and unexpensive, will be accessible for groups of people with low income. In this proposal, every module is specifically made to optimize utility and comfort with different modules fitting varying family sizes and needs. There are three module units which consist of a studio, one-bedroom and two-bedroom unit. The studio unit encompasses an area of 35 m² and utilizes space without sacrificing comfort. It consists of an open kitchen and living/sleeping area with an enclosed bathroom. The one-bedroom unit occupies an area of 49 m² with an open kitchen and living space. The separate bedroom enhances privacy while ensuring a link between



Fig. 2. Social housing proposed model; Type 1 – Studio and 1 BHK; Type 2 – 1 BHK and 2 BHK.

different spaces. Subsequently, the two-bedroom unit occupies an area of 84 m² to accommodate a larger household. Similar to previous units, it also consists of an open kitchen and living layout with two bathrooms, one attached to the master bedroom. All units have windows located in each living and bedroom space that allow in ample natural light and offer views of the neighbourhood or communal areas. The blocks (Type 1 and Type 2) can be configured based on the available land plot.

Conclusion:

Individuals and families that have previously faced housing insecurity might gain stability and a feeling of community by being offered affordable and appropriate living environments. Modular housing is an effective means of alleviating the kind of instability in housing by offering secure, pleasant homes at reasonable costs which are comfortable and affordable, thus reducing anxiety and stress among residents. This stability generates a sense of belonging and community cohesiveness by allowing people and families to develop roots and form meaningful ties with neighbors. This promotes the establishment of supportive social networks, in which neighbors may share ideas, resources, and offer assistance to one another. Frequent events and meetings in the common areas encourage socializing hence creating a safer and supportive environment for all. Furthermore, residents have the opportunity to participate in decision-making processes, allowing them to determine what happens in their locality thereby acquiring pride and ownership. Additionally, the variety of housing designs attract inhabitants from different socio-economic backgrounds at various life stages which fosters inclusivity as well as diversity within neighborhoods. These diversified individuals promote contact between other communities, resulting in enhanced knowledge and respect for each other's customs, cultures, and languages. People living in modular homes across cultural lines can develop strong relationships with one another by exchanging stories while respecting each other's cultural heritage. Not only does using modular architecture in affordable housing developments provide shelter, but it also creates lively, supportive communities by facilitating intersecting and unifying people from different economic backgrounds which reduces the risk of social exclusion and sense of separation. As seen from Table 1, the proposed housing model satisfies both tangible and intangible criteria for social sustainability. It promotes urban resilience and offers inclusivity to expat population of RAK. The model suggests affordable housing solutions to all community members, including expat population that can live comfortably while working abroad. The feeling of security and inclusiveness will

Category	Criteria	Housing assessment
Tangible	Good quality housing	Functional and comfortable
	Infrastructure	Well-developed withing the model; depends on the location/neighbourhood
	Facilities and places to work	Depends on the location/neighbourhood
	Public spaces and recreation	Common areas offer retreat and recreation
	Heath care	The model suggests parking at the entrances to the compound and, therefore motivate walking; the availability of healthcare facilities depends on the location
Intangible	Social interaction and networking	Common areas that are centrally located can be used for social events and social interactions/networking
	Cultural expression and exchange	Affordability and common areas promote intercultural exchange and can be used for cultural festivals
	Feeling of belonging and inclusivity	Offers affordable and comfortable housing for all members of the community with different income and develops the feeling of belonging in expat population (that in many cases spend most of the live abroad)
	Feeling of safety and wellbeing	Provides safety to the members of the community with low income and promotes their wellbeing

Table 1. Proposed model of social housing assessment.

retain the expat population of RAK and attract even more. By proposing this housing model, the authors comply with the Emirate's strategy to enhance social housing and inform all decision makers and responsible stakeholders about the importance of better individual housing unit, neighbourhood, city planning that will result in faster social sustainable development of the community and country. As this article addresses the social sustainability related to social housing in RAK, future research will explore the economic and environmental sustainability of the proposed model.

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Food sustainability of gigantic cities.

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DOI: 10.37199/c41000712

Abstract

Due to strong urbanism flow, many cities are continuously growing trending to become gigantic cities. Gigantic means that either the city has a huge number of inhabitants and commuters, or it contains a large part of the whole population of the country and the rest of the territory is moving towards a low-density population. In both cases, food sustainability is one of the most concerning challenges that must be addressed. After a deep literature review, the paper analyzes the main elements in food supply to gigantic cities. Then, possible risks are identified and quantified in a general case, ranking them according to a priority metric (also defined in the research). Risks are approached with solutions based on urban and territorial planning, including the selection of a socio-economical model to be used as a reference and tools to ensure food supply. In the paper, different possible planning strategies derived from African case studies are proposed and evaluated in their application to Tiranë (a city containing a large portion of the whole population) and to other gigantic (in the sense of a very large number of inhabitants and commuters) cities in the world. Results demonstrate that specific planning strategies should be activated at both urban and regional levels to provide local food autonomy, including production, processing, storage and transportation. The research is a portion of wider research about smart cities' urban planning strategies and although it is limited to regions with good climate and fertile neighbouring, its principles can be also extended to more challenging cases from both climate and land quality. The research is also a starting point to define a resilient planning strategy to support, in the long period, the management of the impact of climate change on the food provisioning for very big cities. The paper also proposes a form of cooperative bond (the rural socio-economic model) in the countryside to increase productivity and avoid excessive urbanism, easing the presence of workers in the farms that are supposed to supply the city. The paper considers only normal operational conditions and does not keep into account special conditions like famine, flooding, war and similar. Although these conditions are not considered, the proposed methodology is still applicable to these cases and will be developed in further research.

Keywords: *Circular economy, concrete facades, life cycle assessment.*

Introduction:

Food provisioning is a critical issue in very big cities and should be considered during both strategic regional planning and strategic urban planning to satisfy specific requirements.

This research aims to define these requirements and to provide guidelines to be used for both kinds of planning. All these elements are considered in normal contexts and extraordinary situations (natural disasters, terroristic attacks, ...) have not been considered.

1.1 Research questions and objectives

The research questions are:

1. What are the main requirements for food provisioning planning in gigantic cities?

2. Which could be a strategic approach to regional planning to provide an effective and efficient food supply chain to megacities?

3. Which could be a strategic approach to urban planning to provide an effective and efficient food supply chain to megacities?

The objectives of the research are:

1. Identify the main requirements for a food supply chain for very large cities

2. Identify a strategic approach to regional planning to ensure a reliable, effective and efficient food supply chain for megacities

3. Identify a strategic approach to urban planning to support a reliable, effective and efficient food supply chain for gigantic cities

1.2 Methodology

After a deep literature review, a qualification of the main requirements areas has been done then, for each area, the main requirements have been defined.

Given these requirements, a strategic regional planning approach has been drafted using the SWOT methodology for strategic planning as a guideline.

These guidelines have then been further detailed at both the urban level and the rural level. From this deeper analysis, guidelines for urban strategic planning and rural strategic planning have been defined.

Gigantic cities

2.1 Definition

According to the Cambridge Dictionary, a megacity is “a very large city, especially one with more than 10 million people living in it”. Above the megacity, there is the metacity that, as defined by UN-Habitat (United Nations, 2007) is “massive sprawling conurbations of more than 20 million people”.

In this research, the term gigantic city has to be intended as both for megacity and for metacity. Due to the partially chaotic structure of a typical metacity, some differences will be highlighted where needed but, as a main understanding, a gigantic city can be considered a “city” with a range of inhabitants between ten million and up, even beyond the twenty million threshold.

A food supply chain can be defined starting from the fact that the food industry has the scope of providing food to the human population (Zhong, Xu et al., 2017). This means that it needs a process that connects farmers, processors, distributors and retailers to achieve this target. This is the scope of a food supply chain (FSC) according to Sekuloska and Erceg (2022) and is the definition that will be considered in this study.

2.2 The literature review

As a starting point for the FSC analysis, research about existing literature reviews has been considered to develop the requirements that have to be defined for food provisioning.

A first starting point is the already cited Zhong, Xu et al. (2017) which is a good analysis of FSC management from the perspective of the development of an IT system. This study has been considered because it details which are the elements of the management system, elements that have been used to define the most important areas of the requirements for the FSC.

A second important literature review is Haessner and Haessner et al. (2024) where trends and challenges in FSC have been considered.

Other two important literature reviews that have been considered were the Rejeb, Keogh et al. (2022) about the use of BigData in FSC and the Palazzo and Vollero (2021) about sustainable FSC.

2.3 Food provisioning impact

Place	Yearly kg per capita
Europe	780.6
North America	861.8
Asia	679.7
South America	668.3
Africa	540.8
Oceania	769.1
World	675.2

Table 1 - Per capita yearly food consumption

2.3.1 Traffic and pollution

Looking at the data of the FAO Food and Agriculture Organisation for the year 2018, as an example, per capita consumption is shown in the table below:

Although the table does not distinguish by type of food, it does give an idea of the quantities of food that are needed in a city. In the table below, this value is converted into the number of tonnes needed each day in a giant city, considering the world average of 675.2 kg per capita per year:

Considering that a heavy truck can carry up to about 40 t, but with great difficulty manoeuvring within a city such as the ones we are considering, while a light truck can carry about 5 t, the enormous truck traffic that would occur is evident.

Population	kg/year	kg/day	t/day
10,000,000	6,752,000,000	18,498,630	18,499
20,000,000	13,504,000,000	36,997,260	36,997
30,000,000	20,256,000,000	55,495,890	55,496
40,000,000	27,008,000,000	73,994,521	73,995
50,000,000	33,760,000,000	92,493,151	92,493

Table 2 - Daily food input related to population

Population	t/day	40t trucks/day	5t trucks/day
10,000,000	18,499	462	3,700
20,000,000	36,997	925	7,399
30,000,000	55,496	1,387	11,099
40,000,000	73,995	1,850	14,799
50,000,000	92,493	2,312	18,499

Table 3 - Traffic generated to feed the city

These volumes of heavy and light vehicles are a very conservative estimate as they do not take into account the need to transport packaging, which is not considered in FAO's calculations, nor do they take into account the presence of an additional level of sorting often carried out by vans or cars for freight. Finally, they do not consider waste disposal traffic.

A first problem is therefore related to the difficulty of managing such heavy freight traffic, as well as to spatial planning and the management of intermediate goods sorting nodes.

A second problem is related to the environmental impact of such a quantity of transport vehicles for goods alone, which produce noise, thermal pollution and various emissions (particulate matter, unburned hydrocarbons, ...).

A third problem arises from the need to load sufficient food at the origin, which, the further away it is, the greater the impact of food transport.

2.3.2 The Urban Food Movement

Today, food supply systems in developed economies have become very complex. They can be thought of as a continuous flow of goods, supported by specific skills and a set of rules, ranging from the symbols used to the cultural aspects, governing the movement of food through all the stages of the supply chain, from production, through processing, delivery, consumption and on to the treatment of waste at the end of consumption.

This complexity has led to a strong disconnect between food production and food consumption systems in recent decades (Sgroi et Musso, 2022).

This disconnection can be thought of as having developed on several levels: geographical, given the distances involved; economic, given the number of intermediaries; cognitive, as the understanding of the origin of food tends to fade as one moves further away from production; political, as it is difficult for consumers to control that the food chain respects their values and principles; and governance, as it is increasingly in the hands of multinationals according to an oligopoly concept. (Sgroi et Musso, 2022).

In response to these challenges, the action of groups belonging to the more general category of the 'Urban Food Movement' has been ongoing for decades. These groups consist of activists who aim, by acting locally, to solve the disconnections just described, finding solutions and fighting for them to be implemented (Manganelli, 2022).

2.4 The three challenges

Due to massive urbanisation, we are now witnessing rapid urbanisation leading, as already mentioned, to the emergence of large urban settlements in terms of population, and this poses food challenges, both in the minimal sense of food supply and in the sense of going beyond mere survival to obtain quality food, at reasonable prices, with low environmental impact, reducing waste

to the minimum possible. Achieving this requires the definition of Food Urban Policies. In defining these policies, the Urban Food Movement must overcome three challenges (Fichler, 1990).

The first challenge is that of ‘multifunctionality’, i.e. understanding that food is not a commodity like any other but has several additional aspects and therefore performs several functions at once, which must be taken into account.

The second challenge is that of ‘co-governance’, in the sense that urban food policies must not only be designed together with civil society but above all for civil society.

The third challenge is ‘city-regionalism’, which aims to reconnect cities with their surrounding areas in the region.

2.4.1 Multifunctionality

Food cannot be considered a normal commodity as it plays a vital role in the health and well-being of the population, and this happens everywhere on the planet. (Fischler, 1990)

Food not only has a nutritional function, it also has a social function. It enables the creation and development of social interactions along two lines. The first direction is that of conviviality, i.e. the social function of interaction when people sit down at the same table to enjoy a meal together. The second function is that of buying and selling food, including all the intermediate logistical aspects, which involve social as well as economic interactions.

Another function of food is an artistic one in that through gastronomy, individuals develop a particular art form that is then enjoyed by others going beyond the convivial aspect to an aspect of ‘pleasure tasting’ (Poulain & Corbeau, 2002).

Food also has a cultural function, and although this function may vary in intensity depending on the society in which one finds oneself, there is no doubt that it is part of the cultural heritage of a people (Poulain & Corbeau, 2002).

Therefore, in addition to the biological function of survival, which today no longer seems threatened, other requirements emerge and become predominant (precisely because of the absence of this threat of hunger) that make food multifunctional (Fischler, 1990).

2.4.2 Co-governance

Civil society, which can be considered a constellation of organisations, demands that its principles and values be respected when defining and then implementing food policies at the urban level (Lang et al., 2009).

In addition to aspects of multifunctionality, civil society demands foods that improve public health, that are affordable even for the poorest for the sake of greater social justice, that are environmentally friendly at all stages of production, that are part of local culture(s), and other requirements. Those enumerated here are only a sample of such requirements, e.g. social justice can also be translated into forms of production that do not exploit workers.

For these policies to be drafted correctly, but then, above all, to be implemented punctually and diligently, co-governance is required, involving both civil society and the political bodies managing the urban context.

Given the current situation of frequent oligopoly in the food sector and the distances created between the various levels as mentioned above, this challenge also requires the use of innovative but, above all, effective tools.

It is therefore obvious that to implement governance, food policies must be produced in collaboration with civil society (Guthman, 2008), and civil society must be fully involved so that these policies work for civil society and not for the benefit of other actors unrelated to it or even in conflict with it (e.g. multinationals, local powers, crime, etc.).

2.4.3 City-Regionalism

The third challenge stems from the fact that the production of food in remote locations is raising numerous objections among people as this mode of production is seen to violate a whole series of values and principles that have become fundamental for conscious consumers.

Production in remote locations entails numerous problems, the most obvious of which is the impact of long-distance transport. But this is not the only issue. Different cultivation techniques and different regulations on product quality and the quality of treatments used during production can also lead to serious questions on the quality level of the product. For example, in the Mediterranean basin, it is now common practice to have citrus fruits, especially lemons, imported from South Africa point to point, but this not only has a considerable environmental impact but also causes damage to local crops that could easily support national needs, but also necessitates the use of anti-mould treatments that can be harmful to human health (in fact, such lemons are sold with the label of non-edible peel).

The proposal of the Urban Food Movement is therefore to reconnect cities with their surrounding areas, thus extending the concept of the city to the geographical region around it and considering it as a single element by the food function that these neighbouring areas have for the survival, in a general sense, of the city (Jennings et al., 2015).

2.5 Is feeding the city an urban planning issue?

At the time of urban planning, the issue of food is often forgotten, as it is nowadays possible, at least in most developed countries, to take it for granted.

In developed countries, food supply systems are considered to be already well-functioning without the need to address their management and, consequently, this issue is not dealt with at the urban planning stage.

Moreover, in the traditional domain of urban planning, supply systems have never actually been formally considered and, therefore, continue to be ignored.

Unlike the actual urbanisation aspects, food supply systems do not involve large investments and have no financial needs at the urban level. They are therefore not considered in this respect either. Finally, the food supply system is considered a rural non-urban issue and therefore excluded from the planning flow at the urban level.

For these four reasons, there is almost always a serious lack of planning for the food supply system. In practice, until now, it has been left to the normal evolution of things to meet a city's food supply. But now two very important change factors have been introduced.

The first change factor is the size of the city in terms of population, which poses non-negligible challenges as mentioned above.

The second factor is the constraints introduced by the Urban Food Movement, which make integrated rural-urban planning necessary, especially because of the need to satisfy simultaneously the aspects of regionalism, co-governance and multifunctionality of food.

As we move from the practical possibility of drawing food from anywhere on the planet to the need to operate, instead, at the local level, with a great increase in the average quality of food and the focus on sustainability and other aspects, the need arises for integrated planning capable of satisfying all these aspects.

After all these considerations, it is possible to conclude that Food should be integrated into Urban Planning (FAO, 2018).

2.5.1 SWOT Analysis for Urban Food Local Production

Cities can be considered as organisms having their metabolism. This metabolism must be first computed and then supported. Feeding the city with local production means improving food qual-

ity, environmental impact, and costs but it exposes to risks (Guibrunet, 2023). So, switching to urban food local production must be first analyzed and, for this reason, a SWOT analysis has been conducted.

This section presents the final results of a SWOT analysis aimed at understanding the various aspects of local food production for urban consumption.

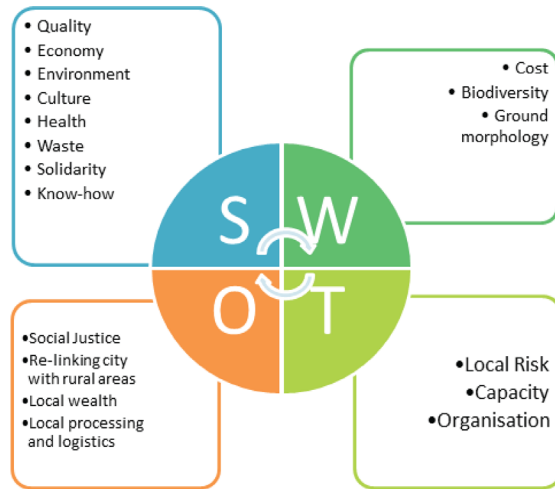


Fig.1/ SWOT analysis of Local Food Systems

2.5.1.1 Strengths

- **Quality:** local production allows greater product quality control and compliance with local standards
- **Economy:** producing locally means stimulating a local and circular economy that leads to an increase in local welfare
- **Environment:** a short supply chain brings countless advantages in environmental terms
- **Culture:** producing locally generally respects cultural traditions
- **Health:** producing food locally means being able to ensure that local protocols and regulations in terms of food safety and quality are respected
- **Waste:** acting locally also means reducing waste by both circular economies and greater coordination between production and consumption
- **Solidarity:** local production makes it possible to create socially useful jobs for the most disadvantaged and in any case to allocate a part of the resources to those who lack the bare minimum
- **Know-how:** localisation of production implies the preservation and improvement of know-how that, also through specific brands, allows the creation of a real industry with all the advantages in terms of quantity, quality and efficiency of production

2.5.1.2 Weaknesses

- **Cost:** when production is local, it generally cannot take advantage of very low production costs and this generally leads to higher prices compared to globalised production but, on the other hand, generally results in higher product quality and faster circulation of wealth at a local level, without its dispersion to remote places controlled, very often, under an oligopoly regime
- **Biodiversity:** local biodiversity could be insufficient, even thinking on a national scale, and could

entail the need to import from remote territories, so the advantages of local production could be lost

- Ground morphology: the conformation of the land may not allow for adequate agricultural development to support the needs of the city with which one wants to integrate and this means having to define cultivation strategies that allow for maximum efficiency, implying more and better coordinated and integrated planning between the rural world surrounding the urban settlement and the urban settlement itself

2.5.1.3 Opportunities

- Social Justice: local food production generally leads to an improvement in social justice as working conditions are more controlled, jobs are created locally and local wealth is increased, levelling out inequalities between different social groups

- Re-linking city with rural areas: re-linking the city with rural areas is perhaps the first effect of an integrated planning strategy between the city and surrounding areas and allows both to benefit from the rural point of view the presence of a large city means the existence of a client capable of absorbing even massive production without problems and at the same time, for the city, this means a reconnection of traditions with the surrounding area, as well as a very high quality of food supply

- Local wealth: if properly managed, the localised economy can become a source of local wealth that counteracts the oligopolistic tendencies that exist today

- Local processing and logistics: the presence of local production greatly favours the development of a system of local processors and local logistics that, in addition to having a more circumscribed environmental impact, allow growth from the primary sector to the secondary sector that then generally leads to development in the tertiary sector.

2.5.1.4 Threats

- Local Risk: However, the localisation of production brings with it risks related to local conditions. For example, prolonged local bad weather could destroy the food supply chain and force one to fall back on other solutions. This means very effective local risk management

- Capacity: the production capacity of the area could prove to be insufficient, both at the beginning and during the development of the city. This is a very important aspect to consider at the planning stage but also the risk management stage

- Organisation: a local food production strategy must necessarily entail a very efficient organisation not only in terms of production, processing and logistics but above all in terms of integrated governance.

2.6 The African Experience

Food systems are changing dramatically in African cities due to various factors (Riley & Crush, 2023). The first of these factors is rapid urbanisation, which is creating urban agglomerations that are growing unevenly, creating vast areas with great disparities according to various points of view. A second factor is the widespread lack of food security that affects large areas of African cities (Riley & Crush, 2023).

A third factor is that the environmental and economic sustainability of Food Systems serving cities requires an intimate understanding of them, to reduce their impact on the environment and, at the same time, improve their economics (Riley & Crush, 2023).

A final factor is that the governance of food systems is proving to be much more complex than is currently manageable in the African context, either due to a lack of specific knowledge in management, a lack of communication, or cultural aspects that do not envisage such mechanisms (Riley

& Crush, 2023).

It is therefore necessary to establish which priority actions need to be resolved to create adequate food policies.

2.6.1 Defining a Food Policy

In the context of the African experience, it is necessary to initiate and complete a series of activities that enable food policy to solve the problems outlined in the first part of this paper.

After careful analysis, also considering the existing literature, the following aspects emerged as priorities in terms of activities to be undertaken. These aspects can be considered common, albeit with different intensities, even for developed countries, since not all African nations are underdeveloped.

2.6.1.1 Formalize informal LFS

The African approach consists of the transformation of food production systems into subsidiary cities that are distinct elements of a single Local Food System (LFS) serving the main city (Haysom, 2023). Thus, the African strategy is delineated as the creation of local productive rural systems linked to subsidiary cities (i.e. becoming subsidiary cities in fact), all serving the main city.

Local Food Systems (LFS) seem to be the solution, based also on the SWOT analysis conducted above at a general level, perfectly applicable to the African case, to ensure food security both in terms of supply capacity and health, as well as to guarantee the various aspects that emerge from the involvement of civil society in the definition of a food policy.

In the African context, LFSs are largely informal. To summarise the differences between a formal and an informal LFS, consider the table below (White, 2023).

Formal FS	Informal FS
Mostly global, can be local	Mostly local
Modern	Traditional but can be modern
Legal but can be unethical	Unlawful, can be legal and ethical
Dynamic	Static
Innovative	Innovation is not widespread
Technology-based	Low level of technology
Growth-oriented, large-scale	Small-scale, family-run
Progressively developed	Static or slowly changing
Trends to monopoly	Trends to fragmentation
Capital concentration	Pre-capitalist, subsistence and survival
Workforce exploitation	Limited workforce
Financially strong	Financially weak
Easy to coordinate	Hard to coordinate
Threats private property	Owners left alone and weak

Table 4 - Formal and Informal Local Food Systems comparison (White, 2023)

As can easily be guessed, even the formalisation of LFS does not solve all problems (e.g. the tendency towards monopoly, concentration of capital and threats to private property are all negative aspects of formal LFS). We will discuss this aspect later, but we can anticipate right now that the formalisation of LFS does not solve the issue.

2.6.1.2 Manage LFS Risk

Local risk management of the LFS is a very important aspect that must be managed appropriately. Without local risk management, the occurrence of adverse conditions paralyses or disintegrates the LFS. Local risk management must be designed with solidarity and the common good in mind to provide the right degree of resilience and sustainability, both economic, social and environmental (Resnick et al., 2023).

2.6.1.3 Increase LFS capacity

The increase in the productive capacity of the LFS must not take place through latifundium or the creation of large companies, because this leads to one of the defects of formal local food systems, namely oligopoly or monopoly. The increase must therefore take place with a view to subsidiarity, i.e. allowing the individual his freedom of action without subordinating himself to the controlling capital, protecting private property but at the same time confederating the various producers so that they can produce with greater capacity and also with greater quality.

2.6.1.4 Involve community

The creation and management of Local Food Systems must necessarily involve the entire community, primarily understood as the subsidiary city community. However, this involvement must be designed to ensure both freedom and speedy decision-making.

2.6.1.5 Ease Social Justice

The African experience, especially when considering developing areas, has shown both the existence and persistence of vast areas of social injustice. This mechanism occurs in both informal and formal LFS contexts. It is therefore crucial to intervene with a different approach that facilitates social justice, which is generally greatly facilitated by the application of the principles of solidarity and subsidiarity (White, 2023; Brown, 2023).

2.6.1.6 Integration with global

Overcoming local limits, both structural and transitory, in terms of capacity, biodiversity, and risk management, implies a capacity to integrate local production with global supply. All this must be built with ad hoc mechanisms that still protect the local from the threats of the global.

2.6.1.7 Solve gender issues

In the African experience, strong gender issues emerge related to the different social roles of the two sexes, where, very often, the female sex often experiences a situation of injustice when not outright exploitation. A similar situation exists with minors. To overcome these issues, it is necessary both to train people so that they acquire more advanced skills and capacities, enabling them to free themselves from the jobs most at risk of exploitation, and to create instruments that protect their freedom and dignity.

2.6.1.8 Include migrants

The African experience, although very fragmented given the enormous variety of socio-political situations on the African continent, has taught us the opportunity to create pathways for the in-

clusion and integration of migrants, which move away from the dynamics of exploitation and xenophobic racism, and towards virtuous cycles of social, cultural and labour integration (Brown, 2023).

2.6.1.9 Support common good

Supporting the common good appears to be the last of the tasks to be implemented, but not the least important, as it is the one that in the long run provides the best opportunities for regional stabilisation and growth.

2.6.2 African Lessons Learned about LFS

Analysing various case studies where formalised local food systems were implemented in the African context, the following lessons learned emerged.

The first lesson learned is that food insecurity remains high even in secondary cities. Despite various attempts to increase food security, secondary cities have unfortunately failed to fulfil their role as reliable and secure providers (Haysom, 2023).

The second lesson learned is that informal local food systems are not able to ensure food security either. This may seem obvious but has been widely confirmed in practice (White, 2023).

Even if formal (supermarket) systems can ensure food security but do not guarantee health, prosperity and social justice. This aspect evident in the possible risks associated with formal FS and with the formalisation of Local Food Systems has also been proven in practice (White, 2023).

Last, but not least, a flexible and powerful tool is needed to design an effective planning tool for the LFS, able to be used in any condition. This last aspect is of utmost importance since, as this integrated planning technique is new, there is a lack of operational tools to enable adequate planning.

A possible solution: distributism

3.1 What Distributism is

Distributism is an economic and social system that originated in the 20th century as a critical response to both capitalism and socialism. Its theoretical foundations were mainly elaborated by two key figures, G.K. Chesterton and Hilaire Belloc, in the late 19th and early 20th century. The main objective of distributism is the equitable distribution of productive property, seeking to avoid the excessive concentrations of wealth and power that often characterise capitalism. In practice, distributism protects private property and is based on the principles of solidarity, subsidiarity and the common good (Belloc, 1938).

Unlike capitalism, which favours the concentration of the means of production in the hands of a few, distributism supports widespread ownership and economic decentralisation. This model promotes small businesses, cooperatives and family ownership as preferred ways of organising production. Proponents of Distributism believe that this decentralisation leads to greater social equity and a fairer distribution of economic benefits (Chesterton, 1926).

Distributism also criticises socialism for its emphasis on state ownership of the means of production, arguing that this can lead to excessive bureaucracy and limit individual freedom. Instead, it proposes a small-scale form of socialism, where ownership is spread among the population, thus reducing dependence on the state (Belloc, 1938).

One of the distinctive aspects of distributism is its emphasis on human dignity and the local community. In other words, it is believed that economic decentralisation not only promotes a fairer distribution of wealth but also strengthens community ties and reduces the alienation often associated with large capitalist systems (Chesterton, 1926; Stine, 2016).

Distributism remains, however, according to some, a theoretical model that has not been widely

implemented in practice on a global scale. Some elements of its thought have influenced local policies and movements, but it has not been widely adopted. Many argue that the contemporary world presents challenges and complexities that make the practical implementation of a distributist (i.e. based on Distributism) model on a global scale difficult (Block et al., 2007).

In the context of this paper, however, as the scale is local (in the sense of regional), it can be successfully implemented, as numerous success stories have amply demonstrated such as:

- Sierra Leone (Sierra Leone Chesterton's Center)
- LaZooz (block-chain managed ridesharing app)
- Mondragon, Spain (Mondragon Corporation)
- Emilia-Romagna, Italy, the "Cooperative Economy"
- Taiwan, "Land to the Tiller"
- Alphonse Desjardins, Canada, "Caisses Populaires Desjardins"
- United States, some farming communities and cooperatives in the United States have also embraced distributist ideas, seeking to retain ownership and control of resources locally rather than concentrating them in large corporations.

3.2 Distributism advantages

Distributism enables urban planning to include food systems progressively, with the ability to govern their evolution and enables both a smooth transition from informal to formal and direct formal startup.

Distributism enables the execution of all Food Policy Tasks.

Distributism is a model that has the strength of simplicity but requires a strong people awareness. It perfectly suits medium-term or long-term planning and allows strong involvement of the local communities.

It strongly supports local food systems but can integrate them with global food systems.

3.3 Distributism comparison matrix

Distributism is proposed as a middle way between formal and informal Local Food Systems and allows for the resolution of the various problems that have emerged from the African experience. The following table shows the three systems, formal local food system, distributism and informal local food system, according to the schematisation made earlier.

Results

To both provide food supply in larger cities and satisfy the requirements of the Urban Food Movement it is necessary that feeding the city becomes one element of both urban and regional planning. Many strategies are possible but, observing the African experience and extending it to gigantic cities, transforming cities surrounding the gigantic one into secondary cities that have the focus to feed (and also provide other goods through local manufacturing) is a strategy that can be easily replicated on any scale and has a good effectiveness. A tool to support this transformation should be founded on transforming informal food systems into formal ones. Unfortunately, formal food systems have some disadvantages that must be overcome. One possible solution, that has the advantage of being progressively applicable, involving a large part of the local community, and with good effectiveness, increasing at the same time the common good and the people's awareness about food quality, is Distributism. Distributism application requires focused education of local communities to apply for solidarity, subsidiarity and common good. Distributism can support both transitions from latifundium and fragmented land property. Distributism, federating small productive entities, will both increase quality and reduces costs (economic, environmental and human). It also fuels, through local credit

Formal FS	Distributism	Informal FS
Mostly global, can be local	Mostly local, can deal with global	Mostly local
Modern	Modern, preserving tradition	Traditional but can be modern
Legal but can be unethical	Legal and ethical	Unlawful, can be legal and ethical
Dynamic	Dynamic	Static
Innovative	Innovative	Innovation is not widespread
Technology-based	Technology-based, preserves workforce	Low level of technology
Growth-oriented, large - scale	Both small and large scale, grows by federation	Small-scale, family-run
Progressively developed	Can be both progressive and static	Static or slowly changing
Trends to monopoly	Avoid both monopoly and fragmentation	Trends to fragmentation
Capital concentration	Avoids capital concentration, shares wealth	Pre-capitalist, subsistence and survival
Workforce exploitation	Owned by workforce	Limited workforce
Financially strong	Financially strong, solidarity	Financially weak
Easy to coordinate	Medium grade of coordination	Hard to coordinate
Threats private property	Protects private property	Owners left alone and weak

Table 5 - Distributism applied to LFS

and autonomous development, the creation of a local processing chain that, together with a local supply chain, will create an integrated logistics system as depicted in the analysis diagram below: To both provide food supply in larger cities and satisfy the requirements of the Urban Food Movement it is necessary that feeding the city becomes one element of both urban and regional planning. Many strategies are possible but, observing the African experience and extending it to gigantic cities, transforming cities surrounding the gigantic one into secondary cities that have the focus to feed (and also provide other goods through local manufacturing) is a strategy that can be easily replicated on any scale and has a good effectiveness. A tool to support this transformation should be founded on transforming informal food systems into formal ones. Unfortunately, formal food systems have some disadvantages that must be overcome. One possible solution, that has the advantage of being progressively applicable, involving a large part of the local community, and with good effectiveness, increasing at the same time the common good and the people's awareness about food quality, is Distributism. Distributism application requires focused education of local communities to apply for solidarity, subsidiarity and common good. Distributism can support both transitions from latifundium and fragmented land property. Distributism, federating small productive entities, will both increase quality and reduce costs (economic, environmental and human). It also fuels, through local credit

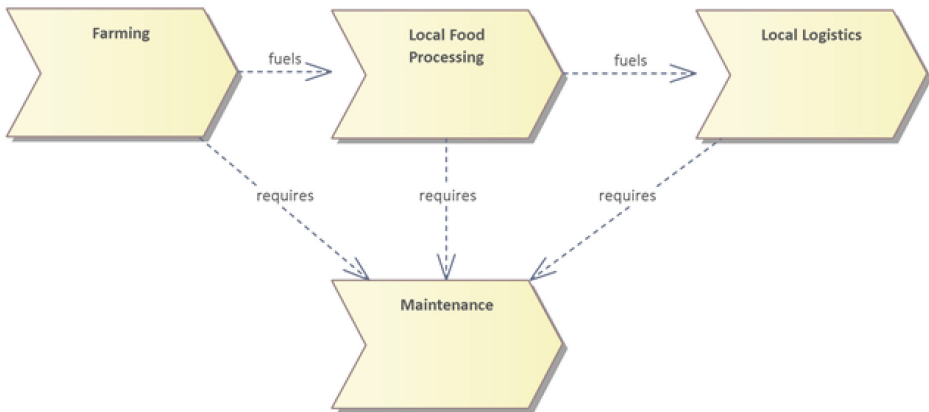


Figure 2 - Local Integrated Logistics System

and autonomous development, the creation of a local processing chain that, together with a local supply chain, will create an integrated logistics system as depicted in the analysis diagram below:

Conclusions

Food Systems to support city metabolism is an urban planning issue and this should be addressed in future city planning. The first step in addressing this issue is to define a methodology that could integrate urban planning.

From African experience emerge some requirements and a sort of initial framework that evidence the need to further analyze the problem of feeding the cities.

The local communities require new values and must be involved in the food policy definition and its evolution. However, the standard solutions, according to the African experience, seem not effective in supporting these values. Distributism is one possible solution that is suitable on a regional scale.

The results of this article can be applied to both large and medium-sized cities because the need to plan the feeding of the city has resulted being an urban planning matter.

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04 - Environmental Sustainability and Green Transition & Sustainability of Urban Policy and Governance

This subtheme centers on the environmental aspects of urban sustainability and the transition towards greener urban environments. It looks at strategies for mitigating environmental impacts, promoting biodiversity, and transitioning to low-carbon and resource-efficient urban systems.

This subtheme discusses the role of policy and governance in urban sustainability. It considers how effective policy-making, governance structures, and institutional practices can support the implementation of sustainability and resilience strategies in urban areas.

Nile as Laboratory. Exploring River Dynamics through Eighteen Projects.

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DOI: 10.37199/c41000713

Abstract

Inspired by Brandi's (1963) assertion that "Egypt is not a country; it is a river," the Nile becomes the central character, driving both imagination and collaboration in architectural solutions. The NiLab research and design laboratory has been developed for the Egypt Pavilion at the 18th International Architecture Exhibition, the Venice Biennale. As the primary driver of imagination and working together in architecture, water represents the basic choices accompanying the entire journey presented in this volume through six Nile landscapes – Natura, Agro, Urbe, Infrastructure, Industry, and Archaeology. Along them, eighteen project intervention areas have been selected as the scene of an international encounter between Egypt, African populations, and the planet. Together with the Faculty of Engineering of the Ain-Shams University of Cairo (Egypt) and the dArTe Department of the Mediterranea University of Reggio Calabria (Italy), 24 international Universities have been invited to build the NiLab, where students, teachers, and young researchers have engaged in concrete design practice to discuss the possible scenarios of a macro-theme: the Nile, an emblematic opportunity to reflect on the theme of water, representative of the planet Earth's rivers, in the wider context of climate change. NiLab's six landscapes are proposed as "mixture" spaces (Coccia, 2016) where to find overlapping and/or disappeared local cultures and interrupted or deconstructed identities. These places produce theoretical and practical questions and doubts, thus becoming fields of experimentation on the project's ontology. It is a critical tool for the current state and, simultaneously, a territory of ideas for the future. Project is therefore engaged as research rather than as a solution to a practical question, aimed at understanding the meaning of the knowledge of the places, even at a theoretical level, the more philosophical boundaries of the topics covered, the relationship between disciplinarity, and the synthesis of knowledge. The NiLab eighteen projects represent research, but also experimentation with a different approach to the dynamics of rivers in different contexts. Thus, sustainability is declined with respect to an architectural and urban design imagination. Ultimately, NiLab offers a unique perspective, treating the Nile not just as a geographical entity but as a living force shaping landscapes, cultures, and the future of our planet.

Keywords: Nile, research, rivers, urban design

Egypt at the time of crisis

The theme of the research proposed for the Egypt Pavilion at the 18th International Architecture Exhibition Venice Biennale is the Nile River as a territory of complex habitation. The Nile responds to the epochal themes posed by the 2023 Biennale - decarbonization, decolonization - as an experimental "laboratory of the future" in its "sympoiesis" (Haraway, 2020) with Egypt, already described by Herodotus when he stated that "Egypt is the Nile, and the Nile is Egypt" (Wilkinson

2017).

On the one hand, are nature, culture, and environment in a millennial narrative; on the other hand, it is the geographical crossroads between Europe and Africa, rich in contaminations along with contradictions and critical historical events. Within this dualism, the architectural project does not remain in the background along our route. Instead, it finds new elements for reflection, insight, and imagination.

Climate crisis, drought, energy sustainability - all these themes call into play the Nile, in an area where 95 percent is desert and 96 percent of the population lives on its banks. The ongoing entropy processes in the delta and along the river - salinization, drought - certainly recall the great stages of civilization. As Jeremy Rifkin wrote:

The vast hydraulic empires of the Middle East, India, and China gave rise to a great leap forward in human consciousness and the first bloom of universal empathic sentiment. But in the end, they were unable to escape the verity of the Second Law of Thermodynamics. A strong body of research into the rise and fall of hydraulic civilizations has shown that while there are many explanations that account for their eventual demise, at the very top of the list is the entropy bill brought by the changes in soil salinity and sedimentation. (Rifkin, 2009)

Of course, besides contemporary catastrophism, there are ongoing, planet-wide environmental processes that require tools and actions, often in rupture with the past.

First, great changes have occurred in history along the Nile - the construction of large reservoirs and the artificialization of the banks. Those were all often too nonchalant globalization-aimed actions, distorting the relationship between city-countryside, nature, and sustainability. Despite this, water and hydraulic landscapes in Egypt still represent the identity elements of both the past and - especially - the future. Eyes are still centered on the Nile as an infrastructure, economy, myth, and historical landscape identity. This pervasive gaze is, at the same time, often dismayed concerning the awareness of the “grammatical” richness of water. As a fluid body, it imprints identity and character on the landscape through its geological, morphological, and vegetational connotations in its relationship between action, technique, and environment. Also, concerning transformations, this dismayal risks losing the necessary balance between functional needs and symbolic design features. Undoubtedly, a desacralization process has taken place over the years in places where sacrality has always been present in nature, architecture, and memory, representing a universal material and intangible heritage. Uncontrolled pollution and the “colonization” of shores by production processes often detached from their contexts and indifferent to possible environmental and landscape relations have altered the thousand-year-old dynamics of a fluid threshold that had made water/land interactivity a universal territorial value. As Gaston Bachelard states:

Water dominates the fluid, unhindered language, the continuous, interrupted language, the language that makes the rhythm more elastic, that gives uniform matter to different rhythms. (Bachelard, 2006)

In this sense, the Nile has imposed itself on the geography of the desert through a liquidity that imprints biodiversity and new morphological, ecological, and territorial complexities. These must be evaluated and updated in the design language as well, especially in an epochal phase increasingly projected toward resource entropy.

Moreover, the Egyptian area is suspended between the Mediterranean - hence European - belonging and the African continent, pervaded by strongly identity-based cultural overlaps and interpretations to be broken down into precolonial, colonial, and global. It synthesizes a landscape and ur-

ban hybridization, which must be recovered at the scale of places and their authentic expressions. In a history that seems to be marked by often traumatic interruptions, perhaps it is necessary to reconnect the threads of the interaction with local resources on the economic, productive, cultural, and social levels. Thus, architecture can also rediscover the languages of the future and sustainability in the African continent and introduce them back into the international debate with their historical and geographical potential. It is a crucial node also if we consider the destructive effects of climate change on the deltas of major rivers such as the Nile, Ganges, Mekong, etc. will result in the displacement of millions of people by 2050 (European Commission, 2008).

The Nile project

Despite the geographical dimension, as the Nile is one of the largest river basins on the planet, its imagery lives in a unified idea where the scale relationship alternates between large and small, between a place of nature and a place of the Gods. The yellow desert and the blue line are signs of a perennial synthesis that requires considering a project as the result of a single thought, unfolding and taking shape unitarily. In this sense, we speak of the “Nile Project” as an attempt to re-think it without losing the desire for unity built throughout history and memory. We speak of unity in the awareness of a project that reflects on the need to find the correct definition of the reality of the Nile: not a single megalopolis, nor a limitless building continuum “lost in its immensity. Without ever reaching itself. Nor being able to get out of itself” (Paz, 1995) but a fluid linear sign to easily escape from and get lost in the “labyrinths” of the desert. Thus, it is a linear edge of water, needing a name against the elusive possible definitions of contemporary cities and territory. However, it is still relatable to a single region with complex and extraordinary morphologies despite the epochal and territorial changes that have taken place, starting with the large artificial dams. It stretches for two hundred and sixty kilometers from the Aswan Dam to the Delta on the Mediterranean Sea, with its five hundred meters of navigable width and one hundred and thirty-four islands laden with biodiversity. Such is the site of the project, concentrated on a few points yet projected toward a single ideal and physical tension. The Grand Tour on Nile, the research journey conducted for the 2023 Biennale through the navigation of the Nile from Aswan to the Mediterranean, re-proposes looking from the water in a spatiotemporal conception that evokes the sense of passage and landscape. Water is central, as a vital resource to be safeguarded and restored in its expressive and poetic power. The watercourse is considered a body in the natural and urban landscape. Its changing form receives continuous modifications through its banks and edges due to currents, fluidity, and the soil it bathes, crosses, invades, and shapes.

A fluid point of view within the Nile is the choice and the prerequisite to achieve a critical view. In contemporary times, standpoints have too often been indifferent and unaware of the land-water relationship, perpetrating pollution, excessive threshold mineralization, irrational exploitation of resources, and destruction of biodiversity and collective memory. This temporal narrative starts from the water and identifies sequences of a complex and irrationally expanded settlement system, of an invasive and obsolete industrial economy, often imported from outside, placed before a soil linked to geomorphological dynamism, layered with history and nature.

In this sense, rather than as a summation of projects, we speak of the Nile project as a general dimension or a new utopia capable of going beyond pre-existing elements. The underlying cultural vision shall not be configured as superstructural but attentive to the relationships with nature, the environment, and the built heritage.

It is a utopia of reality, not aimed at the abstraction of totalizing models. Instead, from its critical and cognitive charge, it conceives a project as constructing new imaginaries for the future in a

pacified balance between nature and artifice, local resources, and innovation. This is why it may be the most appropriate alternative to globalization: along with economic interests, the latter builds landscapes of cultural and social misunderstanding, outlining new connotations of colonization. Without renouncing disciplinary idioms and tools, this project does not start from scratch and a *tabula rasa*. Instead, it aims to help re-compose a fabric characterized by natural and territorial grammar, historical iconographies, forms, memories, and local cultures.

Thus, NiLab proposes the Nile River as a Laboratory of reflection and knowledge, of ideas and experimentation, through six landscapes - Agro, Nature, Urbe, Industry, Infrastructure, and Archaeology. These do not constitute separate geographical and thematical spheres. Instead, they are perspectives on deconstructing places and landscapes whose boundaries blur and interpenetrate into a complex design dimension yet focused on local geographies and their possible interpretation and enhancement modalities. They are standpoints to describe the long Nile and its settlements in a complexity of unified social, cultural, and historical value, where the project is tasked with repositioning its gaze beyond the existing elements, beyond performative solutions as the only answer to current problems, to aspire to and imagine new configurations concerning issues of sustainability, climate crisis and new energy needs, resource sharing and a different dialogue with nature.

This design perspective aims to overcome the widespread positions in the contemporary debate around climate change issues, often dictated by an environmentalist approach and the attribution of the disruption of the biosphere purely to the action of human civilization, by resorting to the Anthropocene narrative (Crutzen, 2014) to denote the current geological epoch. According to Nicolas Bourriaud, it is an “ambiguous” term for Nicolas Bourriaud in which “the human is reduced to its effects,” setting the current climate emergency as a man-made technical condition that humans can remedy.

This perspective

[...] legitimizes practices to convert the Earth into a human paradise, according to outdated urban and “new nature” or nature-garden clichés. Despite these views, it is life, and not human beings alone, that is the long-lasting engine driving the world in the making. (Sanford 2023)

At the same time, more complex reflections emerge, multiplying the standpoints of the current themes by inviting us “to be inside the problem” (Haraway, 2020). The underlying idea is of a “being” that corresponds to the need to take time to experience relationships and develop “tentacular thinking” (ibid), where nature itself is a system of relationships, of which we are a part.

Climate is the name and metaphysical structure of mixing. For there to be climate, all elements within the space must be mixed and recognizable. (Coccia, 2016)

In this sense, Nilab’s six landscapes are proposed as “mixing” spaces (ibid) where to find overlapping or disappeared local cultures interrupted or deconstructed identities that must be observed from a pre-colonialist standpoint: spaces of a network in a “world we should share with other forms of life” (Bourriaud, 2020). In this sense, the six landscapes formulate theoretical and practical questions and doubts and become fields of experimentation on the project’s ontology. Beyond individual and specific solutions, a project itself becomes a critical tool to analyze the existing elements and yet a field of ideas for the future, capable of communicating the principles of self-determination and cultural independence.

In Nile Landscapes, the focus is traced back to water in its wetting, connecting, crossing, transforming, affecting, and shaping different environmental and urban conditions. This is its strategic direction: an opportunity to rethink natural and urban spaces and the infrastructural system -

roads, levees, canals, dams, cable networks - conceived as a spatial device endowed with architectural and landscape quality, not just technical character.

They are now required to undergo a genetic mutation, standing as something more than the functional response that brought them into being, for how increasingly technically perfected it may be. As already mentioned, their required added value concerns the possibility of influencing the places with which they come into contact at multiple levels. On the one hand, they can control their own impact; on the other, they can give multiple responses to territories or cities, whose opportunities for reorganization can only often derive from their “smart” presence, while plans or programs can no longer guarantee them. In times when the term Smart is compulsively applied to any activity [...], the real smartness of new infrastructure should be aimed at improving the physical appearance and livability of the territories it serves. (Ferlenga, 2012)

Therefore, the River edge can be taken as a threshold, a moving boundary, a zone of exchange, a variable thickness, as a “blur” that relates to the “changing and dynamic” nature of water, implying the conception of an open form. In this dilation, the edge can be “a vehicle for a fusion between city and landscape, interpreting the aspiration for a feeling of fusion with nature in the urban subconscious” (Piccarolo, 2019), an “interactive edge” (Nicolin, 2014). It can be a “thickening” of bands with open and flexible ties, conforming new “porosity urban,” where the landscape is taken “as active surface, structuring the condition for new relationships and interactions among the things it supports” (Wall 1999). One could speak of a Third space between land and water, a hybrid landscape designed to “accommodate” mutability, overcoming traditional coastal and levee management in favor of an integrated and multidisciplinary dimension, as a multiscale process of acquisition of knowledge and skills, overturning the current perception of the water element to translate it into the dimension of landscape.

Projects and research

In this edition of the Architecture Biennale, the approach is apparently to show relationships that attempt to respond to an idea of contemporaneity and multidisciplinary complexity rather than architecture, often circumventing the work of architects and the very statutes of their profession. The proposal of the NiLab Laboratory to invite research groups and schools of architecture to reflect on the Nile River with drawings and projects seems to go against the trend. Evidently, for many editions, the Architecture exhibition of the Venice Biennale has attempted to overcome an approach where projects and the production of “forms” were the structural connection with the society and habitat of the planet. The risk is the disconnection with the transformation processes of the city and territories from architecture and concrete design action. Even with the same “suggestions” and “assumptions” needed for architectural projects, ecology, landscape, artificial intelligence, technology, finance, resource scarcity, etc., cannot override the proper disciplinary field of architecture. The epochal changes and articulations of a complex and contradictory contemporaneity undoubtedly challenge the historical connotations of the city and the territory. Thus, this requires the architectural capability of finding new tools, modes, and roles to analyze, describe, and then design them in a project. Indeed, decarbonization, climate change, and decolonization transform attitudes, ways of living, and consumption habits, reminding us of the need to review architectural approaches and ways of thinking, identifying the limits of each knowledge, along with ethical and political implications. Undoubtedly, these approaches require interdisciplinarity and multidisciplinary, yet this does not mean confusing languages and being unable to separate expertise. Otherwise, the project would be assigned a purely formalistic value, reduced to aes-

thetic design, incapable of posing a public and collective value, in full awareness of the relationship between ethics and aesthetics, especially at a time of globalization and technocracy, threatening places and cities.

The architect – now as in previous historical moments – serves the society where they live. [...] The architect has often played the role of advisor and proposer as well as implementer. Not rarely, they have even gone so far as to cast themselves – in the past – in the shoes of the thinker, the utopian, the dreamer, declining the etymology of the project in its most direct and immediate sense: an evocation - here and now - of the future (in Latin, *proiectus* the action of casting forward, thus projecting).

On the other hand, the contemporary architect often falls prey to intricate dynamics, which leads them to see [...] their own role as a “specialized operator” within a much larger and composite process where their own project evidently represents a mere “stage.” (Biraghi, 2019)

In this sense, we speak of the project as research . That is, we see it as somehow untied from the relationship between the question and concrete response. Instead, it is projected to understand and question – also on a theoretical level – the meaning of the knowledge of places, the more philosophical boundaries of the topics covered, and the relationship between disciplinarity and synthesis of knowledge. The academic environment is undoubtedly a more congenial field for the “research project” related to pure experimentation and innovation. Research is the foundation of the university and, as Karl Jaspers says:

... the university accomplishes the original desire to know, which in the first instance has no other purpose than to experience what is possible to know and what we become through knowledge; it realizes the pleasure of knowing in observing, in the method of thinking, in self-criticism as an education in objectivity, but it also accomplishes the experience of limits, of what is not known and also of what must be born in the act of knowledge (Jaspers 1946)

Thus, giving space to the university and architectural schools, where research is inherent in professors’ structural activities, means bringing the project back into a broader architectural dialogue, more open to the system of scientific relations. This dialogue develops horizontally between Western and Eastern experiences, between different languages, and through global questions that move from the specificity of places and their settlement history and represent new challenges for architectural design. Ecology, nature, sustainability, technology, globalization, and the digital revolution become issues in the discussion of design and theory in the process of inventing and constructing architecture without renouncing their statutes and languages. This dialogue is even more vital in territories like Egypt, too often threatened by globalization prevailing over local settlement systems. In this framework, we metaphorically consider the projects for the NiLab modern and ideal Nilometers , cognitive tools for the places along the Nile, sensors of the identity status of landscapes and urban systems, along with their visionary projection, harbingers of a new “cooperation with the natural context that we have learned to perceive as the ‘environment.’” (ibid)

Dialoguing with the great signs of Egypt’s settlement history, which had intensely fascinated Luis Kahn, the projects retrace the journey of the Nile through the primacy of the language of drawing, relating nature and transformation, the existing elements and the imagined futures, in a newfound centrality of the body, often challenged by ongoing processes. These paradigmatic moments, exploring settlement and architectural modalities, are expressed in their character of form and measure, dialectically interacting with nature and the soil without misunderstanding and yielding to

ecological fading or, on the contrary, technological dominance.

In summary:

The project for Geziret-El-Dahab for Cairo - Dahab Island, Cairo - intervenes on one of the islands of the Nile, actual "living creatures" whose existence is linked to the dynamism of water and the nourishment they provide. Biodiversity, the original rural environment, slow movements without the aid of machines, the values of silence and coexistence between man and nature: these are the basis of a vision of "keeping the existing environment" through operations of maintenance and rationalization of pedestrian transportation, low urbanization level, land/water threshold preservation. There is an attempt, that is, to keep away the noise of the looming megalopolis with its immediate "globalized" skyline.

A friendly giant for rebalancing nature - Karaman Island, Sohag - is an "ecological machine", a new "umbilical cord" nurturing the "flower island." It is an out-and-out infrastructure linking tradition and innovation, developed like the great bridges over the Nile, aimed at connecting nature and man-made work. The cultural and research center, a catalyst for functions and new figures in the landscape reflects on the agricultural systems of the future without giving up the identity of a rural economy.

Axis Naturae - Philae Island, Aswan: in the wake of a visionary utopia, a cyclopean aqueduct connecting the Nile with the Suez Canal, the Persian Gulf to the east, and the Gulf of Guinea and the Mediterranean Sea to the southwest and north, constitutes a corridor or modern geographical "Noah's Ark", promoting transhumance and migration of animals and plants, in search of habitats escaped from the climate crisis and at the same time nourished by the water of the Nile itself, perpetuating the myth of the river as the origin and producer of civilization.

Reweaving Edfu - Edfu, Aswan - reflects the sacred relationship with the river and human settlement characterized by the geometry of the agricultural soil texture and the majestic archaeological ruins. In this sense, in addition to marking the reconquest of the threshold between land and water, the architectural promenades along the river's edge, appear as new figures born from processes of hybridization between nature and man-made. Light, air, and climate - i.e., the characters of the place - stand as project elements in dialogue with the architecture, along with fragments of rural soil that invade public land within urban design.

City into Nature - El Fawal Island - Behira: part of the archipelago of islands born from the Nile, El Fawal constitutes a place of biodiversity and indigenous agriculture to be safeguarded from globalized expansive processes of settlement and production. The project proposes a large green park/forest, an ecological lung with an experimental agricultural research and enhancement laboratory at its center, a true sentinel for soil defense and balance between nature and man-made. The stereometric and compact appearance of the building recalls the idea of a fortress and guardian of research and innovation - and, in this case, of identity and tradition.

Egyptian Topography, Sa El Hjar - Gharbia: A hydrographic network, archaeological presences of the former capital in the 26th Dynasty, rural landscape related to a regular agricultural fabric enhanced by P. Klee in the drawings of his trip to Egypt, a compact city whose expansion 'erodes' agricultural soils, constitute the elements under consideration in the project. In this sense, the agricultural park and the urban park dialogue in a mutual enhancement of the existing topography

and iconic signs – natural and man-made – in a reinterpretation of the rich historical iconography.

Archi-Culture - Naqada – Qena: The idea is to rediscover a landscape and architectural balance between one of the oldest cities in Upper Egypt (4,000 B.C.) on the banks of the Nile with one of the most significant archaeological presences related to the cult of the dead and a historical agriculture centered on sugarcane. The relationship between the urban and the rural and rethinking the water-land threshold are the main elements of the project. Aiming to combine memory and the future, the project hierarchically identifies three axes and focal architectural points on the tourism and tertiary level in a newfound centrality of the Nile.

The Two Cities - Tell El Amarna, Menia: The current relationship between the historic city and the archaeological city characterized by ‘indifference’ and the impossibility of mutual exchange is reversed into a dualism, with the buffer zone as an opportunity to create a memory trail. An out-and-out incision is performing, serving as a watershed and a glue between the two sides at the same time, creating an open-air museum that collects archaeological artifacts and stratifications, capable of producing knowledge and evocative vision of one of the most important sites among the capitals of ancient Egypt. Archaeology then has an active role in regenerating the city and providing a new tourism modality.

Operative Void - Downtown, Cairo – operates on an existing modern and contemporary part of the city undergoing decentralization and thus new reconfigurations. The central point is the dialogue with the ancient city and the contemporary need for sustainability. The gaze is turned to the interiors of historic mosques to propose a new urban organism, conceived as a great void, to resume settlement morphologies where the interior-exterior mediation can be found. Thus, the future Downtown is a void/oasis, bounded by an edge/enclosure that determines the sense of living of the Islamic and ancient city, in its distributive principles, in the relationship between full and empty, in the relationship between architecture, green spaces, and water.

Inclusion in Another World - High Dam – Aswan: Over time, on the one hand, the Aswan High Dam has fulfilled issues of security and resource rationalization; on the other hand, it still stands as an interrupted project in terms of landscape, environment, and land use. Desert, river, and infrastructure represent three different Ecologies, three components of a possible vision that still need re-connection. In particular, the scale of infrastructural intervention can be the pivot to rebalance the river as “nature” with the wilderness as “antinature.”

Between the Infrastructures: Light, Water, and Public Spaces - Magra El Oyoum, Cairo: The remnants of the ancient aqueduct, metabolized by the current uncontrolled building sprawl, provide a cue and an anchor for the regeneration of public space on the theme of sustainability within the city of Cairo. In fact, the ruin is rethought as a service infrastructure between old and new, around which urban and collective outdoor spaces are developed. Water, light, and solar energy are the language and characterizing elements of the hybridization idea of a sustainable infrastructure that reaffirms memory and innovation.

O.A.S.I. KE-MET Infrastructure of the living world - El Qanater El Khayreya - Shubra Elkhema: The project is set at the confluence of the Mietta and Rosetta branches of the Nile, an oasis of relevant biodiversity and ecological balance, and stands as a meeting place of material and immaterial values. Reconciliation with the “Living” river through ‘amphibious’ filtering and intermediary devices - piers, pergolas, covered temporary spaces, functional volumes, soil modeling - is com-

bined with reflection on the relationship with the institutional governance of places, in a vision of harmonious coexistence between agriculture, fishing and tourism.

City of Boats - Ezbet El Borg – Damietta: Here, the symbiosis of water and land, city, and fishing is completely fulfilled. Endless sails, docks, boats, varieties of color, and the smell of water lead to evocative imagery of the “city of boats”. This is acquired as a project idea, both on the level of metaphor and the concrete level of image. Natural and man-made forms, stacked over time, characterize an identity landscape form for tourism of places, conceived as wind, light, and water, but also history, material work, and the art of building.

Retrofitting [Industrial] Ecologies - Naga Hamady, Qena - The need to redevelop an obsolete and heavily polluting industrial system, an obvious sign of the desacralization process of the Nile, encourages rethinking a stretch of riverfront along with its relationship with the urban and agricultural landscape. The abandonment of old production systems leads to constructing a complex infrastructure, where manufactories, businesses, residences, and an agricultural park coexist under the banner of sustainability and the use of recyclable resources. The “large dimension” has been chosen and developed horizontally on the river edge through signs with recognizable geometry, in a direct dialogue with the great monuments of Egyptian archaeology.

From Concrete to Nature. Green Industries Headquarters for a Renewed Development of the City - Helwan, Cairo: “The great beauty” of Egypt’s monumental tradition, which has inspired universal art and architecture (the project cites K.F. Schinkel’s scenographies for Mozart’s *The Magic Flute*), underlies an ethical need to compensate a place that, after being appreciated for its charm as a spa and world resort until the early 20th century, has become a polluting industrial and mining center superimposed on historic and natural landscapes. The idea is to initiate a transition process between the man-made landscape of production, some of whose parts are considered modern archaeology, and the agricultural and riverine landscapes, reconstructing a new multipurpose citadel based on a settlement system where the grid of the large industrial scale serves as a “regulatory layout.”

Abydos, Act of Palimpsest - Abydos Temple, Sohag - operates on a geographical area where the clash for possession of territory between the green nature of the Nile and the yellow desert is still evident. There is still a sharp line dividing the agricultural edge of the rural settlements and the large sacred archaeological area, which was once intended to safeguard the tombs of the pharaohs. In this sense, the project of the entrance locates the places of reception and knowledge (museum, workshops, services) while tracing directions and axes of orientation, as interpretation keys to monuments and sacred places scattered in the desert just in front.

Elroda Nilometer - Cairo - Gardens of Nile and Archeological/ecological Park - intervenes in the sites of Egypt’s first Muslim capital, south of Cairo. Agrarian landscapes and Nile waterscapes are marked by significant iconic presences: the Nilometer, an architectural device for controlling and monitoring the Nile, and vast abandoned archaeological areas. The project stands as an operation of land reorganization according to a measurement unit derived from Egyptian cubits (about 70 m), reconfiguring water spaces and new soil clods as metaphors for the island landscapes of the Great River. The Nilometer fulfills the dual function of an archaeological artifact and, at the same time, an active landmark for the new park and the surrounding landscape.

Floating Institution - Qaitbay Citadel, Rosetta: A hybrid, swampy liquid belt is interposed between

the magmatic agglomeration of the village and the fluid of the Nile. Despite careless expansion indifferent to the ecological and environmental values of the site, which are present in a vast iconography, especially from the Napoleonic period, the symbiosis with the landscape and various production and manufacturing activities is still present. The project attempts “landscape restoration,” with the settlement principle of water plots that “urbanize” the river as a new structure for the public space, reconstructing historic palm groves, and hybridizing the edge, with explicit evocative references to historical iconography.

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Spatial Dimensions of Contemporary Energy Policies in Expanding Metropolitan Areas

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DOI: 10.37199/c41000714

Abstract

The issue of energy occupies a significant position in contemporary policies aimed at achieving sustainable development goals. In order to achieve a sustainable future through the integration of social, economic, and environmental goals, energy policies seek to reduce carbon dioxide emissions, increase access to clean energy at affordable prices, and increase energy efficiency. It is therefore emphasised that energy policies are of critical importance even in determining how land will be used in expanding urban areas. In this context, energy policies in expanding cities and even metropolises have the potential to support sustainable development goals. Contemporary energy policies significantly affect the sustainability and energy efficiency of urban settlements. Factors that directly affect energy demand and use are included in land use decisions. Energy-efficient planning and policies recommend actions that take into account factors that influence energy demand in order to promote sustainable energy use in urban environments. This study examines the spatial characteristics of settlements on the Mediterranean coast at different scales and their inclusion in contemporary energy strategies. A classification is made using literature research, local policy and strategy reports of countries and cities at different scales, and research covering the energy-related studies of organisations. Although there are dominant settlement areas in countries bordering the Mediterranean, these cities can be characterised by factors such as energy needs and urbanisation since they are under common climatic conditions.

The necessity for the adoption of regulatory energy efficiency legislation and national energy efficiency programmes in Mediterranean countries has been a prominent theme in recent scientific research and local policies. Increasing energy efficiency and reducing energy consumption and emissions are frequently highlighted as key priorities in this region. Research conducted at the meso-micro level of energy policy emphasises the importance of user participation in evaluating optimisation results and suggests adaptable methodologies in various contexts. Ultimately, it can be concluded that energy policies in countries bordering the Mediterranean must include urban planning, the efficient use of renewable energy resources, environmental protection and social participation. The success of these policies should be shaped and implemented taking into account regional characteristics and local needs.

Keywords: Energy, Energy policy, sustainable development, Mediterranean

Introduction

The attainment of sustainable development goals in contemporary times is intricately tied to the efficacy of energy policies. Pursuing a sustainable future entails the seamless integration of social, economic, and environmental objectives. Positioned at the nucleus of a nation's overarching economic, environmental, and political framework, energy policy assumes paramount significance. Its intricate nature perennially situates it at the forefront of national agendas, influenced by an array of factors including the scope of fossil fuel reserves, geographical positioning, accessibility

of vital resources, and the labyrinthine web of geopolitical interactions among nations engaged in energy exportation and importation (Alola et al., 2019; Jablonski et al., 2012; Jebali et al., 2017). Environmental energy policies aim to reduce carbon dioxide emissions, increase access to clean energy at affordable prices, and enhance energy efficiency. A comprehensive approach encompassing various dimensions is essential in defining energy policies for local governments. It is equally crucial to establish energy-efficient buildings and infrastructure that contribute to socially just and comfortable living environments, ensure equitable access to energy, and promote energy-saving practices. From an economic perspective, factors such as energy costs, efficiency, contributions to the economy, and pursuit of energy independence take precedence. Additionally, the environmental dimension necessitates focusing on reducing greenhouse gas emissions, improving air and water quality, conserving natural resources, and ensuring the sustainability of green spaces (Longo et al., 2020; Natanian & Wortmann, 2021; Pacheco et al., 2012; Song et al., 2017). This holds particularly true for rapidly growing metropolitan areas experiencing significant expansion and transformation, where energy policies are pivotal in land use planning. Research indicates that energy policy serves as a primary determinant of land use in expanding metropolitan areas. Thus, it is understood that energy policies in metropolitan areas hold substantial potential in supporting sustainable development goals. The sustainability of urban settlements and energy efficiency are significantly influenced by energy policies, with land use decisions encompassing factors directly impacting energy demand and usage. Energy-efficient planning and policies recommend actions that consider factors influencing energy demand to promote sustainable energy use in urban environments (MAEP, 2020; Roma, 2023; Urban Learning, 2023).

The sustainability and energy efficiency of urban settlements underscore the necessity for a holistic approach within contemporary spatial planning paradigms. Land-use decisions directly impact energy demand and consumption. Energy-efficient planning and policies advocate actions that consider factors influencing energy demand to promote sustainable energy use in urban environments. In this context, this study examines how the spatial characteristics of metropolitan areas are integrated into modern energy strategies. Drawing examples from worldwide contexts and coastal regions of the Mediterranean, this research presents illustrations to demonstrate the practical analysis of the physical and geographical dimensions of energy efficiency. The Mediterranean coastline hosts numerous metropolitan areas characterized by factors such as climate conditions, energy needs, and urbanization trends. Through examples and experiences, the study explores how energy policies in various domains are shaped by spatial considerations. This analysis contributes to understanding the geographical ramifications of energy policies in burgeoning metropolitan areas and informs future planning endeavors.

The Mediterranean coast holds strategic importance concerning urbanization and energy management. Sustainable growth of metropolitan areas and energy efficiency necessitate the adoption of contemporary energy policies. In this context, the integration of spatial planning issues with optimal utilization of limited resources is imperative. The Mediterranean coast exhibits a potential to effectively harness climate advantages. Scientific research will play a fundamental role in developing spatial and non-spatial policies in the region, contributing significantly to supporting environmental sustainability and fostering economic development. Metropolitan areas with high energy demand stand out as priority areas for policy formulation and implementation in achieving sustainable growth and efficient energy management.

This research relies on an extensive sample encompassing Mediterranean countries, including Gibraltar, Spain, France, Monaco, Italy, Slovenia, Croatia, Montenegro, Albania, Greece, Türkiye, Cyprus, Syria, Palestine, Israel, Lebanon, Egypt, Libya, Malta, Tunisia, Algeria, Morocco, and Bosnia and Herzegovina. These samples are subject to various growth rates in urbanization processes due to increasing population values, spatial growth trends, and the influence of economic, social,

and political dynamics. In this context, addressing the challenges arising from increased energy demands through sustainable energy policies has become a fundamental priority in contemporary planning policies. This study aims to compile these complex and multidimensional aspects. Its objective is to determine whether settlements in the shared climatic zone are benefiting from energy resources in a sustainable manner or to identify differences in country policies.

Methodology

This section discusses the methodology concerning the location, physical geography, population changes, and compiled literature information of coastal cities around the Mediterranean and their surrounding countries.

2.1. Mediterranean Countries

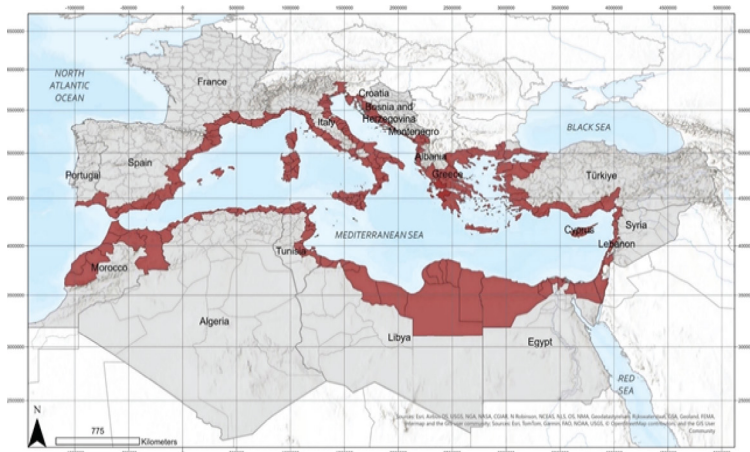
The Mediterranean region encompasses nations situated in Southern Europe, the Middle East, and North Africa, all of which have immediate borders with the Mediterranean. Despite their diverse nationalities, these Mediterranean countries share a common climate and geography. The region exhibits similar vegetation and cultural features. The climatic attributes, varied landscapes, historical significance, and economic stakes of the region derive from intricate interconnections and historical integration among Mediterranean civilizations. The unique essence of the Mediterranean has been a melting pot for numerous cultures, resulting in a blend that has profoundly shaped social, cultural, economic, and even environmental aspects through their interactions. Figure 1 delineates the countries surrounding the Mediterranean Sea and the administrative units with a coastline along the Mediterranean Sea.

Mediterranean countries comprise Gibraltar, Spain, France, Monaco, Italy, Slovenia, Croatia, Montenegro, Albania, Greece, Türkiye, Cyprus, Syria, Palestine, Israel, Lebanon, Egypt, Libya, Malta, Tunisia, Algeria, Morocco, and Bosnia and Herzegovina. Examining population changes in these Mediterranean countries reveals notable trends. From the 1990s to the 2000s, countries such as Albania, Bosnia and Herzegovina, and Jordan continued to experience declining population growth rates. Albania and Bosnia and Herzegovina even witnessed negative population growth rates in certain years. Conversely, Türkiye's population growth rate appears to have increased and then stabilized. After 2010, there was an uptick in population growth rates in Balkan countries like Bosnia and Herzegovina and Albania, as well as in Middle Eastern countries such as Jordan and Israel. Meanwhile, both Türkiye and Egypt experienced declines in their population growth rates during this period. By 2020, it is evident that many countries are facing a decline in their population growth rates. In general, an analysis of population data reveals periodic fluctuations in population growth rates in Balkan countries and the Middle East, as per data from the World Bank (2023).

2.2. Data Collection

The methodology of this study is based on a comprehensive literature review focusing on energy policies, energy efficiency, and spatial factors in countries neighboring the Mediterranean. The review spans the last two decades. Inputs from regional and national authorities, along with references to various databases, scientific publications, national policy documents, and local policies, were compiled to gather relevant studies.

This compilation includes research investigating the evolution of energy policies, underlying principles, contextual factors, and the impact of spatial elements on energy strategies in countries bordering the Mediterranean. An analytical approach was employed throughout the review process to fully comprehend the current state of knowledge regarding energy management. At this stage,



data obtained at both regional and national levels underwent rigorous evaluation to illuminate the fundamental understanding of energy policy development and the underlying principles supporting these policies. Local energy policies were classified into a common framework at macro, meso, and micro scales.

Literature Review

The examination of energy policies in Mediterranean Countries spans from the macro to the micro scale in the literature review.

3.1. Exploring energy policy approaches in Mediterranean Countries at a macro scale

The focus of this study encompasses the countries and metropolitan areas surrounding the Mediterranean basin. From this point, the Mediterranean basin is encircled by the continents of Europe, Asia, and Africa, where the Mediterranean climate prevails due to the convergence of these three nations. This climatic type exerts a significant influence on sectors such as agriculture, tourism, and maritime trade in the region. Regarding energy supply and distribution, the Mediterranean climate poses both challenges and opportunities. The region's sunny climate offers considerable potential for solar energy production, while wind energy also emerges as a promising energy source. The solar and wind potential of the Mediterranean region supports the integration of renewable energy sources into the energy policies of these areas (Fathi Nassar & Yassin Alsadi, 2019; Kaldellis & Apostolou, 2017).

Although the Mediterranean climate provides favorable conditions for solar energy production, wind energy proves particularly effective in coastal areas (Ben Amar et al., 2008). Nonetheless, challenges persist in terms of energy supply and distribution, as economic and political disparities among countries in the region can impact energy trade and cooperation.

Achieving sustainable utilization of coastal areas necessitates striking a balance between tourism and energy generation. Ongoing research is delving into the potential efficacy of offshore wind farms for energy generation and their ecological ramifications (Lacal-Arántegui et al., 2020). Simi-

larly, the development of solar energy installations in coastal regions mandates careful consideration of environmental impacts and land usage concerns.

The effectiveness of energy policies in Mediterranean countries should encompass economic, social, and environmental dimensions. Community engagement and collaboration with local stakeholders play pivotal roles in fostering acceptance and success of energy initiatives (Longo et al., 2020). Furthermore, energy efficiency measures ought to be seamlessly integrated into land-use planning. For instance, urban revitalization endeavors should strive to augment the prevalence of energy-efficient structures, while enhancing public transportation systems is paramount (Okeil, 2010; Pacheco et al., 2012; Song et al., 2017).

The Euro-Mediterranean Partnership comprises the 15 Member States of the European Union and, since 1995, an additional 12 countries spanning North Africa and the Eastern Mediterranean. These 12 countries include Algeria, Cyprus, Egypt, Israel, Jordan, Lebanon, Malta, Morocco, Syria, Tunisia, and Türkiye. The Euro-Mediterranean Energy Partnership has delineated three primary energy policy objectives: ensuring security of supply, enhancing the competitiveness of the energy sector, and preserving environmental integrity. Among the notable challenges confronting this partnership, the substantial political dimension warrants particular attention. The Mediterranean region encompasses a heterogeneous group of 12 countries, each characterized by distinct economic profiles, energy market configurations, and individual national energy priorities and policy objectives (Kagiannas et al., 2003). It is evident that both national and regional policies are evaluating the opportunities and benefits presented by the Mediterranean climate in terms of energy (Jablonski et al., 2012).

Alola et al. (2019) examine the dynamics of renewable energy consumption in Mediterranean countries (Spain, France, Slovenia, Greece, Türkiye, Lebanon, and Israel), accounting for geographical and ecological factors, carbon emissions, and housing policies. Employing various methodologies, the study scrutinizes the enduring positive relationship between housing, real income, tourism, carbon emissions, and the expansion of renewable energy. However, short-term deviations tend to revert to long-term equilibrium, except in Israel, where housing policy has not propelled renewable energy development. According to Jebali et al. (2017), from a policy perspective, two principal findings emerged concerning energy efficiency and its determinants in Mediterranean countries. Firstly, a sustained decline in energy efficiency was observed in the Mediterranean region during the period 2009-2012. Secondly, factors conducive to enhancing energy efficiency were identified. While France, Italy, and Malta attained the highest energy efficiency scores among Mediterranean countries, it was underscored that Eastern and Southern Mediterranean countries should adopt robust regulatory frameworks for energy efficiency and national agendas to enhance their energy efficiency.

Elevating the proportion of renewable energy in total energy consumption in Mediterranean countries was identified as a significant impediment to enhancing energy efficiency in this region. It was also observed that economic growth contributes to improving energy efficiency, implying that as economic growth accelerates in this region, energy efficiency will correspondingly rise. This contention suggests that such economic growth will engender enhanced energy efficiency through an augmentation in the share of less energy-intensive sectors, such as financial services, rather than an expansion in the industrial share of energy. The affirmative impact of population density on energy efficiency has also been discerned, with countries exhibiting high population density, such as Malta and Italy, demonstrating higher energy efficiency (Jebali et al., 2017).

3.2. Energy policies in metropolises surrounding the Mediterranean at a meso-micro scale

Examining energy policies implemented at the meso-micro scale within national frameworks re-

veals the presence of approximately 23 metropolitan areas spread across the 13 Mediterranean countries. This observation underscores the substantial potential of energy policies in rapidly expanding metropolitan regions to contribute to sustainable development objectives. Ozarisoy and Altan's study (2021) addresses the imperative for energy-efficient retrofitting of outdated social housing in South-Eastern Europe, probing into the intricate interplay among socio-demographic factors, building attributes, and energy consumption. Employing a socio-technical systems approach, the study scrutinizes energy usage in post-war Mediterranean housing, elucidating correlations between variables such as income, age, and thermal comfort, thereby offering insights for enhancing energy policies in Cyprus and Europe.

Natanian and Wortmann (2021) advocate for a methodology aimed at integrating optimization techniques into energy-oriented urban and architectural design investigations in warm climates. Taking Tel Aviv as a case study, their four-step approach comprehensively assesses energy supply and demand parameters, links predictive metrics with energy performance, conducts solar and geometric optimization within a multi-objective optimization framework, and evaluates optimal outcomes through energy simulations. Notably, the research delves into the impact of morphological factors on energy supply and demand, revealing the intricate interaction between urban form, solar potential, and energy efficiency.

Analyzing the energy action plans of the metropolises within the study's scope, Spain emerges as noteworthy. In Barcelona, the city is strategically progressing towards energy self-reliance by prioritizing energy transition. The city aspires to achieve carbon neutrality through 100% utilization of renewable energy, democratization of energy access, and reclamation of energy management as a public service. Initiatives to reduce energy consumption include enhancing energy efficiency, promoting local energy production, and advocating for clean energy usage (The City Council, 2023). Valencia has surpassed the European Climate Pact's 2020 targets within nearly 12 years through energy and urban transformation efforts. The city has slashed greenhouse gas emissions by 31% and curbed energy consumption by 18%. It aims to further reduce emissions by 40%, enhance energy efficiency, and increase renewable energy utilization to 27% by 2030. Additionally, it champions sustainable transportation modes and supports eco-friendly tourism (The València Climate and Sustainable Energy Action Plan, 2023). Málaga has pledged its commitment to the European Covenant of Mayors, striving to achieve a 20% reduction in CO₂ emissions by 2020. Moreover, the city has participated in the Green Digital City Card program, actively engaging in energy management, lighting initiatives, and electricity generation (Málaga City Council, 2014; Malaga Smart, 2023).

In Italy, Rome's Smart City Plan encompasses several policy initiatives aimed at promoting energy efficiency and the adoption of clean energy, which are being integrated with technological innovations (Nastasi & Di Matteo, 2016; Roma, 2023). Meanwhile, Milan is recognizing its potential role in addressing climate change and is formulating sustainable energy strategies. The city is implementing various measures to encourage energy conservation, the utilization of clean energy, and the adoption of green technologies throughout its urban landscape (Comune di Milano, 2009; Nastasi & Di Matteo, 2016). Naples has garnered attention by establishing the first renewable energy community, creating a community-driven energy initiative through the installation of solar panels in an underserved area of the city (Nastasi & Di Matteo, 2016; Zanchini, 2023).

In France, Marseille has developed an ecological and intelligent energy network known as the "Massileo" project, leveraging the temperature differential between seawater and freshwater to provide heating and cooling for a neighborhood. Supported by funding from the European Cohesion Policy, this initiative has attracted interest from other nations due to its feasibility (The

European Commission, 2018). Similarly, the city of Nice has initiated projects focusing on sustainability and renewable energy. By prioritizing energy efficiency, electric mobility, and green technologies, it actively promotes sustainable energy objectives (IRIS, 2023). Toulon, a major port city, plays a crucial role in industry, maritime activities, and tourism. It has implemented significant measures in energy and sustainability, particularly aiming to reduce the environmental impact of the port and maritime sectors through enhanced energy efficiency. The city aims to reduce carbon dioxide emissions by enabling ships in the harbor to operate on electricity, achieved through the installation of electrical connection points in the harbor and other measures (MAEP, 2020).

In Croatia, Zagreb is integrating energy policy into urban planning, supporting sustainable energy objectives through activities such as energy efficiency measures, the utilization of renewable energy sources, and the adoption of environmentally friendly fuels and green technologies (Urban Learning, 2023). In Gaza, the Palestinian government is promoting sustainable energy sources over traditional ones, recognizing the vital role of energy sector enhancement for economic progress and development in Gaza. Significant upgrades and expansions of the electricity grid are urgently required to meet current demand (ITA, 2023). In Türkiye, Istanbul has implemented energy and sustainability action plans at the local community level, such as in Kadıköy and Şişli. Antalya is implementing measures to reduce energy consumption and greenhouse gas emissions as part of its Sustainable Energy and Climate Action Plan. The city has devised a comprehensive strategy that includes measures to decrease energy consumption in buildings, transportation, and other sectors (Antalya Metropolitan Municipality, 2022). Izmir is undertaking projects aimed at environmental preservation and sustainable urban development, striving to reduce CO₂ emissions, adapt to climate change, and ensure sustainable and accessible energy (İzmir Metropolitan Municipality, 2016).

In Greece, Athens, Thessaloniki, and Patras; in Portugal, Lisbon and Porto; in Egypt, Cairo and Alexandria; in Tunisia, Tunis; and in Algeria, Algiers, nationwide energy action plans are in place. These cities are actively engaged in initiatives aimed at enhancing energy efficiency, utilizing clean energy sources, and pursuing sustainability objectives.

Results of the Research

This study investigates the energy policies of nations and metropolitan regions surrounding the Mediterranean basin. The Mediterranean climate significantly impacts various sectors such as agriculture, tourism, and maritime trade, presenting both challenges and opportunities for energy supply and distribution. While economic and political disparities among countries affect energy trade and cooperation, achieving sustainable development in coastal areas requires balancing tourism and energy production. Research on offshore wind energy and solar energy in coastal regions continues.

Since 1995, the Euro-Mediterranean Energy Partnership, comprising 15 EU Member States and 12 additional countries, aims to ensure energy security, enhance competitiveness, and preserve environmental integrity. However, economic disparities among the 12 Mediterranean countries with distinct energy priorities and policy objectives pose challenges. Recognizing the energy potential of the Mediterranean climate, national and regional policies emphasize the need for regulatory frameworks to improve energy efficiency.

Research examines dynamics of renewable energy consumption and determinants of energy efficiency in Mediterranean countries. Despite a positive correlation between renewable energy consumption and factors like housing, real income, and tour

Country/City	Scale	Key Objectives and Initiatives of Energy Policy Focus	Challenges and Considerations
Euro-Mediterranean Partnership	Macro	Ensuring security of supply, improving competitiveness, safeguarding environmental integrity	Political dimension, diverse economic profiles, energy market configurations, and individual national energy priorities
Mediterranean Countries (Spain, France, Slovenia, Greece, Türkiye, Lebanon, Israel)	Macro	Exploration of renewable energy consumption dynamics, consideration of geographical and ecological factors, carbon emissions, and housing policies	Economic and political differences affecting energy trade and collaboration; challenges in sustainable use of coastal areas; national and regional policies assessing opportunities
Metropolises in the Mediterranean	Meso-Micro	Implementation of energy policies within metropolitan areas; focus on sustainable development goals	Economic, social, and environmental dimensions; community involvement and cooperation with local stakeholders; integration of energy efficiency measures into land-use planning
Metropolitan areas/Cities	Meso-Micro	Various initiatives for energy efficiency, clean energy adoption, and sustainable development	Varied goals, measures, and strategies; success stories in energy transition, reduction of emissions, and adoption of green technologies

Table 1. The energy policies in Mediterranean countries into different categories based on their focus, objectives, and approaches (prepared by the author)

ism, energy efficiency decreased in the region from 2009-2012. Enhancing energy efficiency requires strong regulatory frameworks alongside economic growth contributions. Additionally, countries with high population density exhibit higher energy efficiency.

Analysis of energy policies at the meso-micro scale reveals approximately 23 metropolitan areas across 13 Mediterranean countries (see Table 1). These areas hold significant potential for contributing to sustainable development goals. Studies focus on energy-efficient retrofitting of social housing, integration of optimization techniques into urban design, and implementation of ecological and smart energy networks. Metropolitan cities like Barcelona, Valencia, and Málaga in Spain, and Rome, Milan, and Naples in Italy, demonstrate proactive measures toward energy efficiency and sustainability. Other cities across Mediterranean countries are also implementing nationwide energy action plans to enhance energy efficiency and promote the use of clean energy sources, as depicted in Table 1's classification of energy policies at different scales.

Discussion

In Mediterranean coastal cities and the surrounding countries, the determination of energy-efficient policies takes place under a common framework due to the shared geographical and climatic conditions. This research observes a comprehensive perspective of energy policies at various scales in Mediterranean countries. The study addresses two scales: firstly, at the macro level and across the Mediterranean region concerning approaches to energy policies; and secondly, at the meso-micro level, specifically focusing on the implementation of energy policies and city examples within major metropolitan areas. At the macro level, a perspective has been presented emphasizing the importance of regional cooperation and strategies in energy policies. Goals at this level include ensuring energy supply securi-

ty, enhancing the competitiveness of the energy industry, and preserving environmental integrity. However, factors such as the diverse economic profiles, energy market configurations, and national energy priorities in the region pose challenges to policy implementation. The energy demands of Mediterranean countries are classified into two groups, with different forecast scenarios related to renewable energy sources. According to Bastida-Molina et al. (2022)'s research, energy supply has been emphasized as a fundamental element for the social, environmental, and economic development of a society, along with the need for sustainability in the energy scenario. It is noted that countries located in the Northern part of the Mediterranean exhibit an adequate level of energy consumption but face excessive CO₂ emissions and high external dependence for energy supply. Conversely, countries in the Southern part, including those in the MENA region comprising the Middle East and North Africa, experience deficits in energy supply without issues concerning CO₂ emissions and external energy contribution. It is indicated that countries in the Southern Mediterranean need to significantly increase their energy demand, with renewable sources expected to make a substantial contribution to meeting this demand. The research conducted by Kagiannas et al. (2003) also lends support to the Mediterranean Southern countries aiming to reduce CO₂ emissions.

According to analyses highlighted by Ferrante (2016), the energy policies of Mediterranean countries have focused on factors such as dynamics of renewable energy consumption, geographical and ecological elements, carbon emissions, and housing policies. However, it has been noted that economic and political differences may influence energy trade and cooperation, there are challenges regarding sustainable usage in coastal areas, and national and regional policies evaluate opportunities in the energy sector. Many researchers emphasize the promotion of renewable energy sources, particularly solar and wind energy, underscoring their significant contribution to environmental protection (Ahmed Shata & Hanitsch, 2006; Lira-Loarca et al., 2021; Soukissian et al., 2021). It has been indicated that the development of renewable energy sources (Poza-Vazquez et al., 2011) and diversification of energy resources could also contribute to reducing dependency on external energy supply (Kagiannas et al., 2003).

Observations indicate a focus on the implementation phase of energy policies in metropolitan areas along the Mediterranean coast. According to research conducted by Ferrante (2016), the relationship between population density and energy studies in metropolitan areas is deemed significant. Energy policies aim to contribute to sustainable development goals by shaping the interaction between metropolitan areas and built environments. Various measures are taken to support energy efficiency, clean energy usage, and sustainable development goals through city examples. At this stage, emphasis is placed on the importance of collaboration with local stakeholders and community participation, considering economic, social, and environmental dimensions. From a comprehensive perspective, energy policies in the Mediterranean region exhibit multidimensionality, focusing on sustainable development goals and being open to regional cooperation. However, various challenges are encountered, and it is observed that each country, and even each city, shapes its energy policies according to its own specific conditions and objectives.

Conclusions

The need for adopting regulatory energy efficiency legislation and national energy efficiency programs in Mediterranean countries has been emphasized in recent scientific research and local policies. Additionally, there is an understanding of the necessity to adopt consumption reduction policies for industries with higher energy consumption. Furthermore, increasing awareness of energy savings by encouraging individuals to change their energy-saving habits and raising public awareness is imperative. Given the differences in energy policies among Mediterranean countries, energy efficiency measures

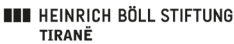
should be a priority for certain countries. Research findings suggest significant potential for improvement through the dissemination of knowledge and transfer of energy efficiency practices among these countries. In terms of policy outcomes, policies aimed at enhancing energy efficiency in the Mediterranean region should focus on large-scale approaches and dissemination of renewable energy technologies. Moreover, countries utilizing fossil fuel subsidies, which could hinder the development and transfer of renewable energy technologies, are encouraged to gradually phase out these subsidies. Increasing energy efficiency and reducing energy consumption and emissions are often highlighted priorities. Research conducted at the meso-micro level of energy policy emphasizes the importance of user participation in evaluating optimization outcomes and proposes adaptable and replicable methodologies in various contexts. Studies involving measurable metrics indicate that they can effectively guide designers to consider energy aspects in early design stages and strengthen sustainable design practices, particularly when combined with optimization techniques. Some findings underscore the importance of aligning policy design with sustainable development goals and future trends in energy efficiency. In conclusion, energy policies in Mediterranean coastal countries should encompass urban planning, efficient utilization of renewable energy sources, environmental protection, and community engagement. The success of these policies should be tailored and implemented considering regional characteristics and local needs. Furthermore, there is a need for improvement in energy storage and transmission infrastructure. Additionally, ongoing energy transition efforts in the region present significant opportunities for sustainable energy production and environmental protection. While energy policies operate at the national level, there is a need for action at the city level where policies are localized, developed, and disseminated.

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