The Relationship between Urban Form and Infrastructure: A Case Study of Finiq Municipality

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Abstract- *This paper explores the complex relationship between urban form and infrastructure within the Finiq Municipality, shedding light on the evolution of its urban centers over the last three decades. The urban form of Finiq is deeply influenced by its infrastructure, especially the road system and transport networks. Understanding this relationship is essential for sustainable urban development.*
The main purpose of this study is to analyze the historical development patterns of Finiq Municipality, compact centers, distributed core centers, distributed centers, and linearly distributed settlements and their impact on its current urban form. Evaluating these different development models, the study seeks to identify the challenges and opportunities for the future of the linear urban form as typical for the Finiq Municipality.
This research uses a comprehensive approach, utilizing historical analysis, literature review, and qualitative assessment. These methods provide insights into the dynamics between urban form and infrastructure, enabling a thorough examination of past, present, and possible future scenarios. The analysis highlights the important role of infrastructure in shaping the urban form of Finiq Municipality.
The findings of this study contribute to the field of architecture by emphasizing the importance of understanding the interaction between urban form and infrastructure. By recognizing the challenges and opportunities presented by different development models, urban planners, and policymakers can make informed decisions to promote sustainable urban development. This research highlights the need for integrated approaches to infrastructure planning and urban design to create livable, resilient cities.

Keywords:
Impact, Infrastructure, Transportation, Urban Form.

Introduction

Urban form refers to the physical attributes that constitute built-up areas, encompassing elements such as shape, size, density, and the configuration of settlements. The urban form of Finiq has evolved since its earliest human settlement, dating back to approximately between the 4th and 2nd century BC. This evolution is continually influenced by social, political, and economic developments, often guided by policies across various sectors. Notably, the shift from centralized to decentralized government in 1991 brought about significant changes and processes, leading to uncontrolled and spontaneous urban development, which has left a profound impact on the present urban landscape. Moreover, the infrastructure, including the road system and transportation, plays a critical role in shaping the urban form. This research aims to enhance our understanding of the links between urban form and infrastructure, considering the uncertain flows they may need to adapt to in the future. Explores a range of conceptually different urban form options and evaluates their performance in relation to various foreseeable challenges. The primary goal is to construct a comprehensive view of the interrelationships between form and "grey" infrastructure systems and how they might be impacted in the future. Investigate the historical evolution of urban form and infrastructure in Finiq Municipality over the past three decades to understand their influence on present spatial organization. Analyze the implications of historical trends on future urban development patterns and infrastructure needs in Finiq Municipality, considering potential challenges such as demographic changes, climate change, resource insecurity, and growing income disparities. Examine the interplay between urban form and infrastructure elements, including shape, size, density, settlement configurations, road systems, and transportation, to shed light on their mutual relationship and implications for sustainable urban development. Explore prospective urban form scenarios for Finiq Municipality, considering diverse settlement patterns and typologies, and assess their feasibility and effectiveness in addressing future challenges and opportunities, such as demographic shifts and environmental changes. The purpose is to understand how urban forms function, without forgetting that they need to be liveable, and are produced within socio-political contexts (Batty, 2008). The historical development of urban form and infrastructure after 1991 In Finiq (Administrative Unit). During the 45 years of the communist regime in Albania, before the 90s, when the movement of people, the economy, and everything was controlled, urban development came as a complementary need in the function of the so-called economic development. In rural areas such as Finiq (today's municipality). Urban development, apart from historic settlements, took place where agricultural cooperatives, farms, and similar infrastructures were located. However, the transition from a centralized political system to a democratic system, where people were free to live where "they wanted". The urban form mainly followed the connecting infrastructure. People preferred to live near roads for better access to various services. This movement trend had a strong impact not only on the urban form but on the territory as a whole. Unlike the urban situation that characterizes Albania today, where urban sprawl has fragmented agricultural land, damaged natural assets, and many other problems. In Finiq, it's noticed a more rational development, agricultural land, and landscape has been preserved. There are more well-connected settlements. Below are two aerial photos, which compare the "typical" urban sprawl of Albania in general and the urban sprawl in Finiq. The first photo is of the Pakuqani area in Tirana and the second photo is of Finiq. Finiq urban form is linearly distributed. These settlements lack a distinct center and are spread across the territory. What sets them apart is their development in a specific direction, often aligned along a linear road axis and the base of a hill. Throughout the period, populations continued to decentralize, characterized by suburbanization and the development of 'edge cities'. During the last 30 years, the mentality of developing the urban form has not changed, it follows the main axis. Densifies along it and they develop in parallel. The changing rural landscape and

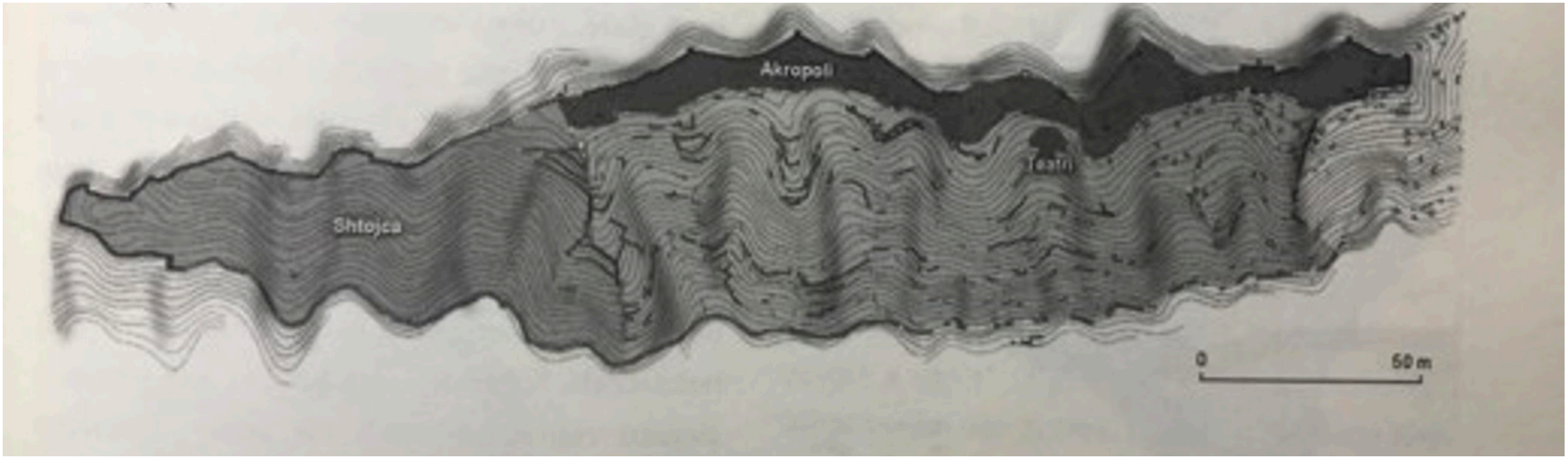

Fig1 / Morphological map of Finiq center
source /

Fig2 / SPaskuqan area, Tirana 2010
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Fig3 / Finiq area, 2023
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Fig4 / The urban development of Finiq over 3 decades
source / the author

car-dominated urban form are two issues that have raised concerns about the sustainability of urban development. The considerable development in rural areas, villages, and small towns has dispersed the built-up area, leading to questions about whether such patterns are sustainable and should be curtailed. This form of development has been compared to a new form of sprawl, which has led to lower-density housing estates on the edge of cities and in more rural locations, facilitating accessibility to edge-city leisure, retail, and employment locations. However, this has also led to challenges as less carbon-intensive futures are sought and as fuel prices rise. The urban development has been facilitated by and planned for, car use, locking residents into car use as they have no other viable ways of traveling. This has led to challenges as less carbon-intensive futures are sought and as fuel prices rise. Understanding the relationship between urban form and infrastructure is crucial for designing sustainable and resilient cities.

Literature review

Urban form is the two and three-dimensional geometrical characteristics of the built-up environment (Batty and Longley 1994, Seto et al 2014, Wentz et al 2018). Urban areas can be viewed as systems where relatively slow-changing urban forms provide the setting for more rapidly changing flows of capital, people, cultures, and technologies. Settlements experience fluctuations in population, shifts in composition, the emergence of new work patterns, and changes in communication. These dynamics also affect businesses, causing shifts in their spatial requirements and mobility needs, while investments and withdrawals of capital have significant spatial impacts. Understanding the interrelationship between urban form and flows is critical in determining the infrastructure needs of societies. Notably, while physical infrastructure is relatively fixed, it must effectively provide reliable and high-quality services, accommodating both the relatively slow-changing urban forms and the rapidly shifting flows of recent times in Finiq Municipality. The configuration of urban spaces, including their shape, size, density, and settlement patterns, is intricately linked with the development of infrastructure such as roads and transportation networks (Kumaraku & Prifti, 2024). This relationship between urban form and infrastructure is crucial for sustainable urban development and effective planning (Ahern, 2013). Historical evolution has significantly influenced urban form and infra-

structure planning. Arturo Soria Y Mata's concept of the linear city, proposed in the late 19th century, envisioned a linear arrangement of urban development along transportation corridors, aiming to alleviate congestion and promote efficient land use (Soria Y Mata, 1882). This concept laid the groundwork for later urban planning initiatives, including those by Le Corbusier. Boris Milyutin, an influential urban planner, proposed the idea of linear cities as a means to organize urban growth and facilitate industrial development (Milyutin, 1929). His vision emphasized the rational allocation of resources and infrastructure to support economic activities along linear axes.

Methodology

This research employs a mixed-methods approach to achieve its objectives of understanding the links between urban form and infrastructure in Finiq Municipality over the past three decades and exploring prospective urban form scenarios for the future. The qualitative aspect of the research involves conducting a thorough historical review of Finiq's urban development patterns, considering data from archival sources, governmental records, and scholarly literature. This will enable us to trace the evolution of urban form and infrastructure, identifying key turning points that have shaped the present urban form. The literature review further enriches our understanding of urban form and infrastructure planning, drawing on historical perspectives and contemporary debates. Concepts such as the linear city, proposed by Arturo Soria Y Mata and later refined by urban planners like Le Corbusier and Boris Milyutin, offer valuable insights into efficient land use, transportation networks, and environmental sustainability.

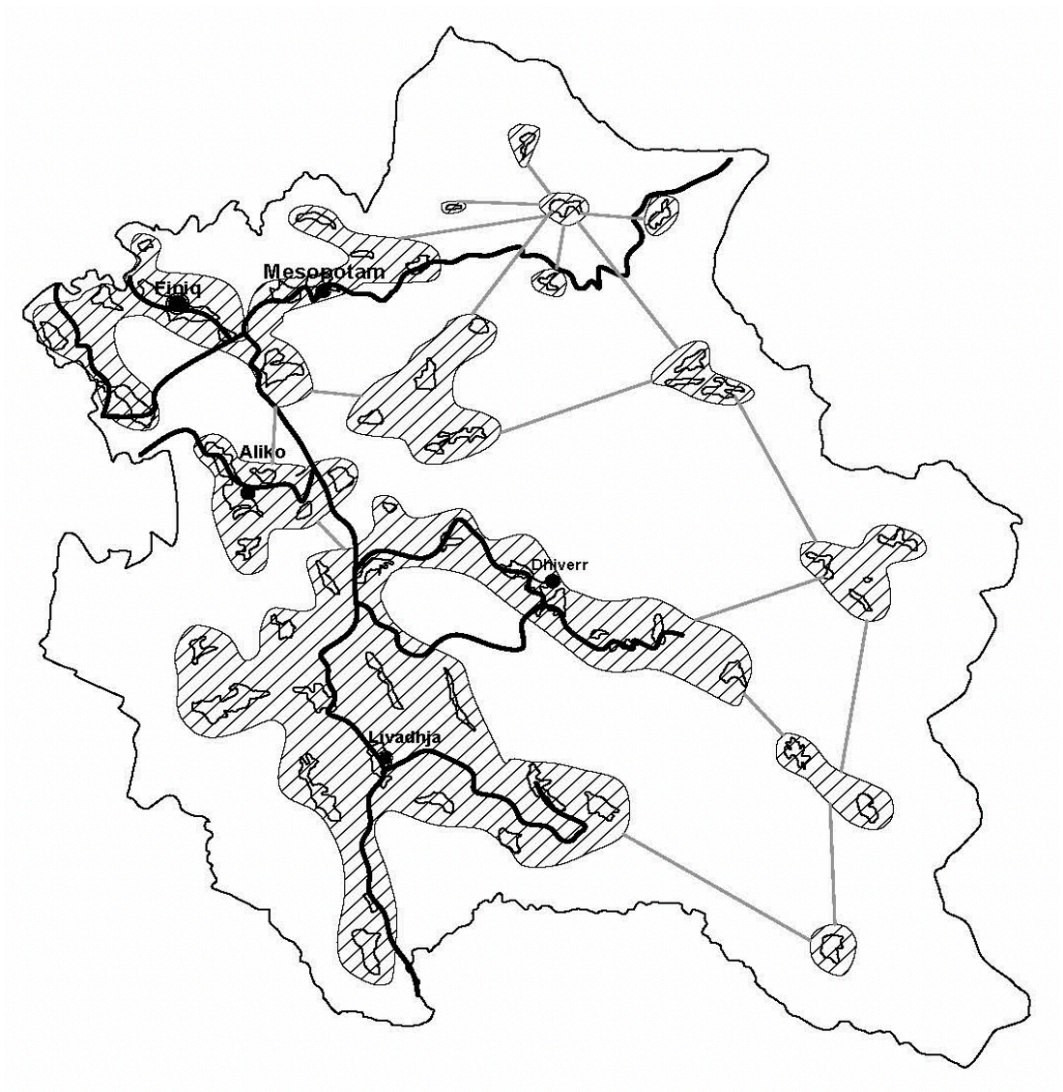

Fig5 / Urban settlements, Finiq Municipality
source / the author

Results and Discussion

Dominant urban form's_Finiq Municipality

Finiq municipality is composed of 5 administrative units comprising a total of 58 villages. These villages exhibit diverse relationships among their settlements and various extension typologies. Within the Municipality of Finiq, settlements are categorized into four main typologies:

- Compact centers (Fig6): These are villages characterized by a single, tightly-knit settlement. This typology is not very common and is usually observed in villages with minimal development pressure.
- Dispersed centers but with a distinct core (Fig7): In this case, a village consists of multiple scattered settlements, with one dominant center that serves as the focal point. These connections between settlements indicate a tendency for village growth, especially in areas with challenging terrain that hinders urban continuity.
- Scattered centers (Fig8): Villages with this typology have numerous small settlements scattered sporadically across the territory, lacking proper connections. Despite having an initial center where the village was founded, unstructured and unplanned growth has led to the development of new settlements in an arbitrary and excessive manner.
- Linearly distributed (Fig9): These settlements lack a distinct center and are spread across the territory. What sets them apart is their development in a specific direction, often aligned along a linear road axis, a waterway, or the base of a hill.

These typologies provide insights into the spatial organization and development patterns of the villages within Finic municipality. As we analyzed above, the center of the municipality itself has grown linearly for 30 years, being a "development model" for all other urban areas.

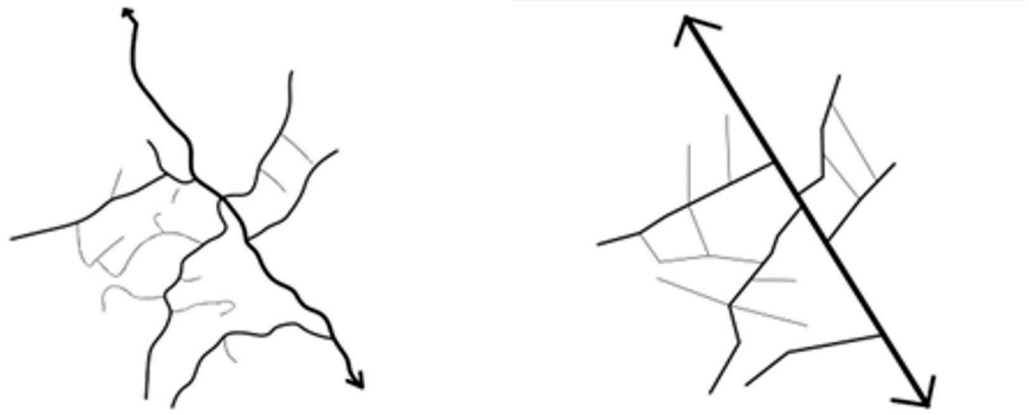

Fig6 / Administrative Unit of Aliko
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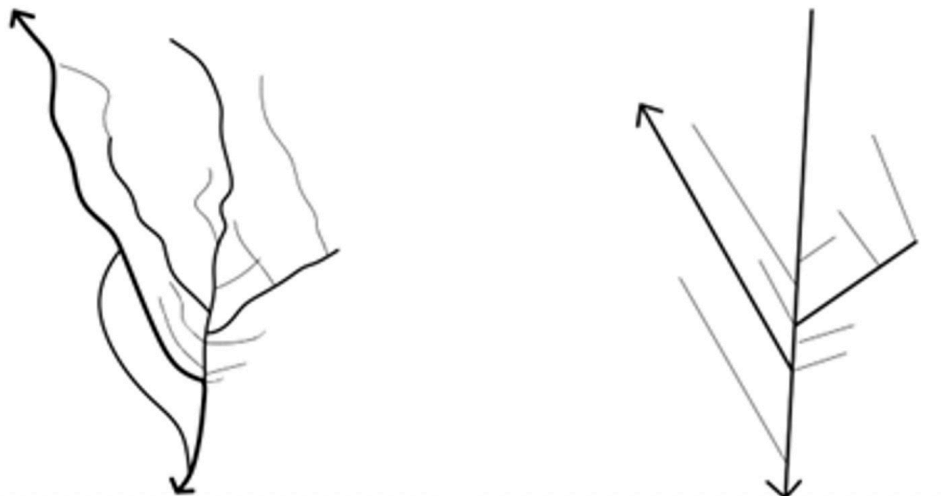

Fig7 / Administrative Unit of Livadhja
source / the author

Benefits:	Challenges:
Linear urban form optimizes land use along linear features, making efficient use of available space.	The lack of a centralised core can result in a lack of community identity.
Development along linear axes increases accessibility and connectivity, particularly along transport corridors.	The linear urban form greatly increases the cost in general terms of affordability of living, which can limit flexibility and connectivity.
The linear urban form offers opportunities for the creation of linear parks or green spaces, improving the quality of life for residents.	Linear development patterns can contribute to urban sprawl, leading to inefficient land use and increased infrastructure costs.
Through the linear urban form, land use can be mixed and the restrictions on the intensity of development along the linear axis are smaller, meeting different needs and preferences.	Development along linear features can have environmental implications, such as habitat fragmentation.

Tab1 / Benefits and Challenges of Linear Urban Form
source / the author

Fig8 / Administrative Unit of Mesopotam
source / the author

Fig9 / Administrative unit of Finiq
source / the author

Conclusions

In conclusion, the linear urban form offers a unique spatial arrangement characterized by development along linear features. While it presents opportunities for efficient land use and increased accessibility, it also presents challenges related to community cohesion, infrastructure dependency, and environmental impact. Understanding the characteristics and implications of linear urban form is essential for sustainable urban planning and development.

The configuration of urban forms, including their shape, size, and density, is closely related to the development of infrastructure such as roads and transport networks.

The linear urban form presents opportunities and challenges for sustainability and resilience. While it can optimize land use and improve access, it can also contribute to urban sprawl, agricultural land fragmentation, and environmental degradation. In contexts such as Finic Municipality, it is important to consider strategies for promoting sustainable development, including compact development, mixed-use zoning, and green infrastructure.

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