

Results and Conclusions

Project-Based Papers: Small-Medium Scale. Strategic Visioning & Design

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Following the conclusions of Issue 01 on Policy-Based papers, for the research project: Re-Inventing Phoeniciae (Foenike, Phoenike, Fenikea, Finiq): New Intersections of Tradition, Innovation, Landscapes and Tourism, below are some other findings of Issue 02 on Project-Based papers: Small-Medium Scale. Strategic Visioning & Design:

1. Proposals for planning and settlement models

Dhurata Shehu, *Polis University – Finiq rebirth through digital transformation and “digital nomads”* – The author states that the topic of shrinking cities is multifaceted and affects cities, regions, metropolitan or cross-border areas, that have faced a rapid decline in their economic and social foundations. Therefore, urban shrinking is frequently a problem for regions on a large scale and necessitates that policymakers rethink conventional regional government models. Albania's population overall decreased also over the last three decades. Such a problem is clear also in the case of Finiq municipality, which is part Saranda-Gjirokastra-Janina region between Albania and Greece. The author observes that most of the living settlements in the municipality of Finiq present a social-economic framework, consisting of a model of shrinking and aging population. For various reasons: mainly economic, unemployment, and lack of services, etc., the young population of these areas has mostly migrated to Greece or the capital Tirana. In order to restructure rural areas in response to shrinkage, information and

communication technology (ICT), digitalization, and knowledge-intensive activities are essential. It is important in these cases to understand different aspects of the digital revolution, since the situation is evolving into a “new normal”, where “digital” is not only a simple response to an emergency but also an ongoing investment against risks. Studies have shown that digital nomads often prefer settlements outside overpopulated urban areas, so they can be a significant contributor to the recovery of the economy in Finiq, which depends largely on the ICT infrastructure level of the municipality. A lot of research on digital nomads concluded that they could be crucial in promoting entrepreneurship and the development of technology clusters. So, the author's question is: How can digital nomads be developed as a new market segment in Finiq? ... and, How can digital nomads be utilized in the local digital ecosystem? The author focuses on digital nomads as an emerging market group and sees possible knowledge transfer functions they might play in the local digital environment.

Franklind Jesku, *Polis University – Co-evolutive Resilience: The Hidden Identity of Phoenicia* – The author states that Finiq is the main settlement in its municipality and has served as an administrative center during the last years. Most of the dwellings are built during 1990–2000, according to the previous and current maps. Because of massive emigration trends, there are many abandoned and unfinished houses. The empty villages that have been abandoned in recent decades make

up a serious problem, which is now typical in many Balkan countries. As a result, various buildings are semi-finished and in a degraded state, both architecturally and structurally. Also, on top of Finiq, there is the archeological site, serving as the main tourist attraction for the town, along with the bucolic scene of the countryside. By analyzing the territory of Finiq author figures out that there is a hidden identity of the urban structure. As the town lays morphologically on the strip, it fragmentizes from the second and third row of buildings, showing a “missed urban typological block”. This seems to create spontaneous empty spaces, that suggest a hidden spirit of the town and is created imaginatively by connecting them. The simple disposal of each building to the nearest one creates what Franco Purini calls the “border distance”, a distance that, like in Michelangelo's fresco, creates a necessary situation for one to feel the magnetic force of attraction or repulsion between the two bodies. The space where this magnetic force is exerted is the key point from which to draw the hidden spirit of Finiq. It is precisely the shape of that space that will determine the rules for the evolution of the town's identity. The author analyzes how this “in-between” space can “co-evolve” if the institutions and people who live there find a common language to reinvent a new but existing architecture of the place. As spotted in the analysis, it can be confirmed that there exists already an identity in Finiq. The “hidden spirit” lies in the empty and fragmented spaces. It is a typical millennial town, therefore something stronger than the constructions ex-

ists there. The resilience of the context's form, space, and time coexists in the lost identity, which can be exposed by intervening surgically. The co-evolution of these public spaces must start from precise rules and regulations which, through the careful analysis of the local architects and urban planners, must be able to direct the inevitable spontaneity of the place's history, without having a drastic top-down effect.

Gabriele Giau, *Ferrara University – Digital Surveying for Revitalization of Finiq Municipality in Albania: Utilizing 3D Technologies for Heritage Preservation and Development* – The Finiq Municipality in Albania is a rural region that is faced with declining population and isolation. These issues are prevalent in many developing rural areas and can have a substantial impact on the preservation of heritage structures and the overall development of the municipality. However, the territory possesses several potential advantages, such as its proximity to Saranda and the Albanian Riviera, the archaeological site of old Finiq (Phoenicia), and the 13th-century Orthodox monastery dedicated to St. Nicholas, as well as quality agribusiness production. Proper implementation of policies at the national, regional, and local levels could lead to a tourism-based revitalization of the area. The author says that data plays a crucial role in the planning process and project development as it forms the basis for informed decision-making and efficient planning in itself. One of the key benefits of data is its ability to reveal patterns and trends, which can be leveraged

for decision-making and improvement opportunities. In addition to demographic and sociological data, information describing the territory and human artifacts in their physical form is also essential. GIS tools are already in use and provide useful cartographic data, which effectively represents the complexity of the territory and the relationships between its various components. This data forms the foundation for creating advanced information systems, such as territorial digital twins, and deepens the knowledge of the territory. Integrated digital surveys, utilizing three-dimensional acquisition technologies such as laser scanning and photogrammetry, can serve as a reliable source of input data for creating these knowledge tools. Point clouds offer valuable morphometric databases that are often critical for documenting not only architectural and cultural heritage but also infrastructure, modern artifacts, and larger portions of the territory. According to the author, different multiscale approaches can be adopted to cater to the specific needs and requirements, for instance providing a detailed understanding of archaeological and monumental heritage, or the contextualization of settlements in the surrounding area. By integrating these data with GIS platforms and BIM models one can create a comprehensive understanding of the municipality's territory, they can be utilized for preservation and conservation efforts, including urban planning and development, as well as identifying potential structural issues. Additionally, the data collected through 3D survey technologies can be utilized to monitor the condition of the buildings and infrastructure, promoting better maintenance and planning, even considering the risks posed by the area, such as seismic or fire risks. The digital data can also be used to create virtual tours and interactive models, promoting the municipality's cultural heritage and economic development. The author underlines that the use of these procedures in a marginal area may initially seem disproportionate, still, it is not so much in relation to the subject of the survey, given the universally recognized historical and artistic value of some areas. The financial effort required to undertake such campaigns may seem substantial, but the project can be implemented in phases, integrated, and completed over time, and be low in financial terms in the long term.

Antonello Aquilano, *Ferrara University* – *Limestone: A Solution for Enhancing Commu-*

nity Identity in Finiq, Albania – The author states his first perception of the municipality of Finiq, that to him is grappling with a multitude of challenges, including a declining population, isolation, and a diminishing sense of community identity. The town according to him is marked by abandoned buildings and a lack of uniformity among the inhabited structures, resulting in an identity-less appearance. Recognizing the significant impact of facade aesthetics on residents' perception of the urban landscape, and acknowledging the historical bond between humans and stone, the author aims to identify local stones for facade renovation of Finiq to enhance the homogeneity of the buildings' appearance, and to contribute to addressing the important issues affecting the town of Finiq. The author's methodology involves a comprehensive review of scientific literature pertaining to regional geology, stratigraphy, rock type quality, and the accessibility and proximity of the site under investigation. In conclusion, limestone, abundant in the region and historically associated with the village of Finiq, has been identified as a potentially suitable building stone for this municipality to help restore architectural identity.

Laura Sacchetti, *Ferrara University* – *Planning and design of territorial healthcare facilities in rural areas: opportunities, advantages and recommendations* – The author states that in most countries, the majority of healthcare facilities and hospitals are located in urban areas, causing limited access to essential medical services and treatments in rural regions. This situation is further exacerbated by the fact that rural areas are often characterized by isolation, poor infrastructure, and a lack of basic amenities. Often, the primary care system has been underdeveloped and does not provide adequate geographical coverage. This issue has far-reaching consequences on the health and well-being of the rural population and needs to be addressed by developing a comprehensive and sustainable strategy to foster the expansion of healthcare facilities in rural regions, as well as for the underlying challenges related to urban development and infrastructure, which impact on the access to healthcare services, in order to face the future demographic, epidemiologic, economic, and social developments. Nowadays, the advantages of an extensive and comprehensive primary care system are well-established and the role of primary care in prevention, treatment, and management are delineated and endorsed in

different strategic national documents. The opportunity of providing rural areas with territorial healthcare facilities is discussed by the author, in comparison with other practicable solutions (e.g. introduction of mobile health clinics, etc.). Several domains are analyzed, including the contributing factors to the development of primary care facilities; the design of primary care centers, including healthcare typologies; new construction or renovation methodologies, including accessibility and recognizability of the facilities; as well as urban regeneration strategies and the implications of the location in rural contexts at the architectural level. The author addresses the case of Albania and the Municipality of Finiq to ensure a possible implementation of the above-mentioned proposed strategy. It includes also an illustration of the possible dimensioning and configuration, as well as guidelines for the design of local health services in the Finiq case.

2. Proposals for the protection and conservation of biodiversity and the Environment

Beatrice Megagnoli, *Ferrara University* – *Finiq Digital Landscape: Remote Sensing, GIS and BIM Tools as a Basis for Flood and Deforestation Strategic Actions* – The author states that the application of Remote Sensing technology has become increasingly important in addressing environmental and landscape challenges, especially for dynamic elements such as waterways and forests. The critical evaluation of multispectral satellite imagery provides valuable insights into the current status and changes in various environmental parameters, such as vegetation indices to monitor changes in vegetation health, land cover, and classification to monitor changes in land use patterns and soil moisture levels. At the same time, there is a need to integrate these data into a landscape project workflow. The digitalization of landscape context can be possible by creating a unique model capable of collecting all analysis data and using them in the decision-making process. The digitalization and design of the built environment are increasingly oriented towards the methodology of Building Information Modeling (BIM), an approach for a collaborative and dynamic design process. The author presents an examination of the use of Remote sensing methodologies as an informative layer inside a digital BIM model for strategic territorial planning of environmental systems as in the

Finiq Municipality. Located almost on the Greece/EU border, Finiq has a very heterogeneous environment where agriculture, forests, water basins, and rivers are surrounded by various gradient morphology; often as a fragile territory due to flood events and soil pollution resulting from settlements and agriculture processes. Remote Sensing (RS) and Geographical Information System (GIS) represent two proficient methodologies for spatially visualizing flood events and deforestation areas through the years. Starting from RS sensing data analysis about water and vegetation and the comparison to land use data of the actual condition, this study aims to create a direct collaboration between analysis and project tool. Through the use of Sentinel-2 satellite imagery maps about different parameters showing the actual conditions, the author investigates how a digital model can be built and how it can collect all the data coming from the analysis phase. By a methodological case study, a new workflow for the creation of a Landscape BIM model is shown and different tools are used, each one for a specific objective. The results of this study provide a valuable contribution to decision-makers and will contribute to addressing the environmental challenges in the Finiq case, within a comprehensive, coordinated, and integrated approach, involving all relevant stakeholders. The author demonstrates the potential of the collaboration of Remote Sensing technology, GIS analysis, and BIM models in addressing environmental and landscape problems, focused on flood and deforestation monitoring, highlighting the importance of considering such technology as a valuable tool in the planning and management of environmental systems.

Eneida Muhamuci, *Polis University* – *The Relationship between Urban Form and Infrastructure: The Case Study of Finiq Municipality* – The author 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 the author is to analyze the historical development patterns of Finiq Municipality, compact centers, distributed core centers, and linearly distributed settlements, and their impact on its current urban form. Evaluating these

different development models, the author seeks to identify the challenges and opportunities for the future of the linear urban form as typical for the Finiq Municipality. She 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 contribute 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. The author highlights the need for integrated approaches to infrastructure planning and urban design to create livable, resilient cities.

Dario Rizzi, *Ferrara University – The Potential of Building Information Modeling in Agricultural Operations* – Building Information Modeling (BIM) has been widely adopted in the construction industry, providing a virtual representation of physical objects and systems. The author expresses the firm opinion that in the context of agriculture, BIM can also be applied to monitor and manage the physical and operational characteristics of farms and agricultural facilities, by using BIM digital twins. A BIM digital twin is a virtual representation of a physical object or system that is based on data from BIM models and other sources. The integration of sensors is essential in creating a BIM digital twin as they provide real-time data that can be used to update and maintain the virtual representation. The use of BIM digital twins in agriculture has the potential to: improve the management of agricultural facilities; reduce environmental pollution; and promote the sustainability of agricultural land. Sensors can be used in agriculture to monitor various parameters such as soil moisture, temperature, and nutrient levels. BIM digital twins can also be used to monitor and manage sources of pollution, such as the use of pesticides and fertilizers, and to develop strategies to minimize their impact on the environment. BIM digital twins provide a comprehensive view of the condition of agricultural land and the factors that influence it, such as weather patterns, industry activities, and human

activities. 4D BIM is an extension of traditional 3D BIM that adds a time dimension to the model. In the context of agriculture, 4D BIM can be used to visualize and simulate various processes related to time and soil management, such as planting and harvesting cycles, and to evaluate the impact of different planting strategies on crop yields. 4D BIM can also be used to model the impact of weather patterns on crop growth and to develop contingency plans for weather-related events. The use of BIM in agriculture has the potential to transform the industry by providing a new level of insight and control over agricultural operations. BIM models can be used to simulate and visualize different scenarios for agricultural facilities, such as the use of water, fertilizer, and energy, leading to improved efficiency and reduced waste. By using BIM to optimize operations, agricultural companies can increase their productivity and profitability. The integration of BIM digital twins and 4D BIM in the agriculture of Finiq has the potential to revolutionize the industry by providing new tools for monitoring and managing agricultural operations. The use of BIM digital twins and 4D BIM can help reduce environmental pollution, promote sustainability, and improve the efficiency and productivity of agricultural operations. Testing is needed to fully understand the potential benefits of BIM and BIM digital twins in the agriculture of Finiq and to develop best practices for their implementation.

3. Proposals for innovative housing models

Albi Alliaj, *Polis University – Redesigning demolished Cultural Heritage: A study of a thin shell design for earthquake-destroyed churches in Finiq municipality* – The author involves the redesign of thin shells on top of ruined cultural heritage buildings, that have almost collapsed in the municipality of Finiq. The main studied object is the orthodox church of Leshnica e Sipërme village, Finiq. Its roof has already collapsed because of an earthquake and the degradation of materials. However, the dominant part of the structure (such as walls and columns), is still standing even though it needs heavy reinforcement. The maximum span of the roof is long enough to justify the use of a thin shell structure which is also the traditional shape. This hypothesis tries to find an elegant solution to this problem, which combines structural beauty and identity, with the efficiency of the design and building pro-

cess, defined as an important aspect of sustainable structural design. The methods proposed by the author for the reconstruction of the existing part of the church include restoration methods used for other monuments in Albania. The propositions take into consideration the state of degradation of each structural element. A goal for the reconstruction of the reinforcing elements is not to affect the primary function of the building while restoring and maintaining the cultural heritage values of the object. The pre-design of the roof is made using non-linear analyses. The shape of the new roof and its thickness are chosen to use the Hanging Model Analysis, the Sanders-Koiter equations, the Membrane Theory, and a buckling analysis using the software Karamba. The design of rigid joints, which connect the roof with the other parts of the structure, is made so that the entire structure can work and behave as one, while it is loaded during its lifespan. The shell is designed as a pre-fabricated one using UHPC material, divided into panels with rigid joints between them. The analysis and validation of the design of the structure is made with the Load Capacity Analysis in the Ultimate Limit State of it using the software Karamba. The author concludes by highlighting the importance of recovering the degraded cultural heritage structures in Finiq. He emphasizes the role that technology can play in ensuring the integration of old heritage structures with new ones by maintaining the identity of villages.

Andrea Nale, *Ferrara University – Innovative applications for civil structures of the Municipality of Finiq using topology optimization and additive manufacturing* – The author underlines the fact that the newest structures of the municipal villages are mostly under construction, often unfinished, half abandoned, or neglected after the boom. It seems the trend of reinforced concrete building construction does not tend to decrease. Therefore it is important to find new solutions, especially those environmentally friendly, economically compatible, and sustainable. This necessity is motivated further by the fact that the industry of concrete is the most energy-intensive industry in the world. In particular, two main aspects of the research are investigating how to address these issues if new manufacturing technologies are applied (e.g. 3D printing), combined also with new computational methodologies, such as topology optimization, and the development of innovative materials (e.g. architected metamaterials). The author

aims to suggest innovative approaches and methodologies in the fields of structural mechanics for civil structures. The proposed approach could be applied not only to buildings under construction but also to the existing ones. They could be restored or completed in some specific structural and non-structural parts. The author proposes new topology optimization strategies that allow to obtain an efficient material layout with maximized performance under predefined constraints. This design method is not only used to optimize the structural behavior of the structures but also for the optimization of specific features (e.g. thermal and acoustic optimization). The interest in this computational method has grown due to the development of innovative techniques of manufacturing (i.e. additive manufacturing). In particular, there are different types of manufacturing that could be used for construction, which differ with respect to the material adopted, (e.g. steel, concrete, or stone-like materials). The proposed method can be supported in Finiq by several examples to understand the potentiality of the approach considering the role of additive manufacturing. Indeed, the development of new manufacturing methods has reduced the distance between the theoretical and practical representation of the optimized layout. In conclusion, the proposed approach allows to obtain novel 3D printable structures characterized by a more efficient use of material, contributing to the realization of the concept of circular economy within the construction industry.

Luca Morganti, *Ferrara University – Exploring the environmental and social sustainability of architecture in Natural Cities: From challenges to opportunities of unfinished buildings development* – As the consequences of climate change become increasingly apparent, it is imperative to enhance the efficiency and control of the construction sector to adapt and mitigate the crisis. The author examines the complex relationship between informal settlements and sustainable urban development. He emphasizes the significance of adopting a human-centered approach to comprehend and tackle the challenges encountered by these settlements. Furthermore, it acknowledges the interconnectivity of urban informality, human nature, and architecture, underscoring the need to observe in detail the case of Finiq. The concept of Natural Cities, which evolved from informal/organic settlements; according to the author, challenges the tra-

ditional divide between society and nature by highlighting their interdependence and coexistence within urban spaces. Sustainable cities embrace this interdependence by following the principles of sustainability and environmental stewardship, striving to strike a balance between the needs of people and the requirements of the natural world. The author addresses the challenges of abandoned or stalled construction projects in Natural Cities, which can be overcome with the right guidelines and boosts, by presenting a theoretical analysis and suggesting several development approaches for unfinished buildings in these settlements. These practices are based on the principles of "build nothing, less, clever, and efficiently" by the World Green Building Council. The author further evaluates the approaches in terms of costs, greenhouse gas emissions, and their alignment with the UN's sustainable development goals. According to him, public investments and services can be encouraged in these structures to incentivize sustainable development, ultimately benefiting the residents of informal settlements who are most affected by these challenges. Empowering and including the residents in the planning and decision-making processes is crucial for success. A human-centered approach applied in Finiq that recognizes the interconnectedness of urban informality, human nature, and architecture is pivotal in realizing sustainable urban development in informal/organic settlements. By considering the symbiotic relationship between urban and natural elements and involving the community in decision-making processes, the author believes that it can foster inclusive and resilient natural cities that harmonize with their surroundings and enhance the well-being of the residents of Finiq Municipality.

