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Using digital survey modeling as a critical process of knowledge: Exploring the evolution of Scanderbeg Memorial in Lezha.

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Abstract - Cultural heritage is an inestimable asset that must be protected, conserved, and valued correctly throughout time. The documenting of built cultural assets is one of the scientific community's major especially in the contemporary age. The goal of this paper is to investigate the evolution process of the Scanderbeg Memorial in Lezha using a critical methodology that includes both integrated digital survey modeling and historical evolution as a process of knowledge and valorization of cultural heritage in order to trace the site's lost sacred space.

Introduction - The article focuses on the case of the Church of St. Nicholas in Lezha, which was first changed into the Seliminye Mosque under Ottoman rule and afterward altered into the Skanderbeg Memorial under communist rule. The purpose of this study is to examine the connections between the design decisions made for the structure and the liturgical traditions that have been housed within it. It does so by utilizing archaeological evidence from

various studies and looking at both the relative and absolute chronology of the building's development.

Lezha is said to have been an important crossing point between the medieval West and the East. The Byzantines, Bulgarians, Normans, and Angevins all left their marks on the northern part of Albania, which is a favored place for circulation and trading. This territory, located on the north-western outskirts of the Byzantine

HISTORIC EVOLUTION OF THE BUILDING

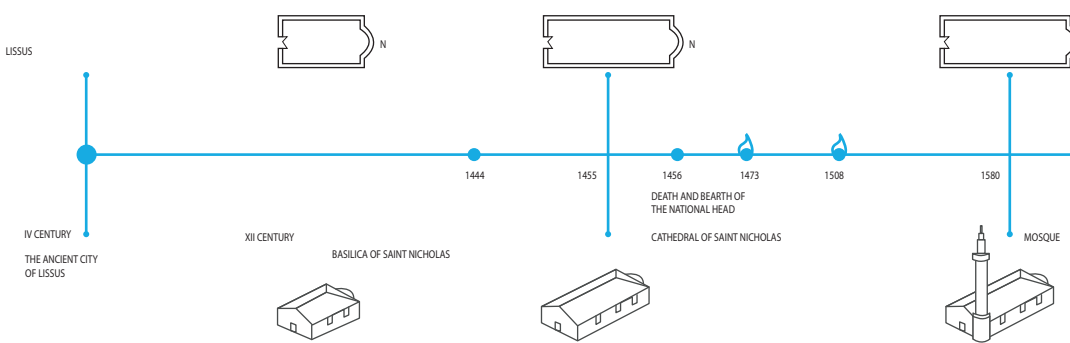


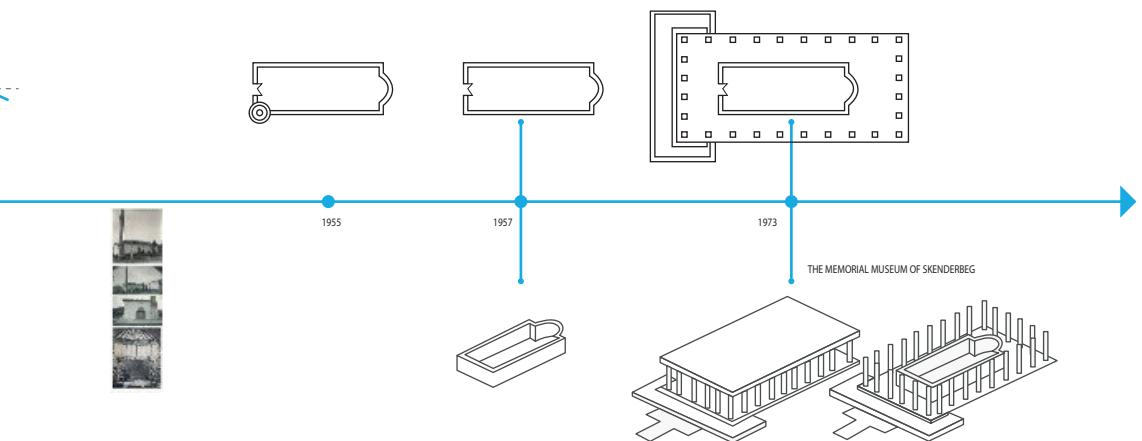
Fig. 1/ Historic evolution of the building, Source Diagram: Author

Empire, on the southern Adriatic, includes mainly the cities of Shkodra (Scodra), Lezha (Lissus), Kruja (Kroon), and Durres (Dyrrachium) (Meksi A. , 1987) (Dhamo, 1974).

2.The Archeology, Landscape and Historic Evolution of the monument

Ancient Lissus, also known as Alessio after the Italianization of the name by the Venetians, is the geographic center of Albania. The Church of St. Nicholas is included in the historical complex that is located within the city of Lezha. Because it is known for the fact that the Albanian hero George Castriot Skanderbeg was laid to rest there, the location has been designated as a national monument. Several different hypotheses regarding the development of

the Church of Saint Nicholas' architectural style have been put up. The first one was discovered by an archaeologist by the name of Frano Prendi. He discovered four different occupation levels. A building that dates back to the third century serves as a representation of the early settlement level to the indeterminate function. Before this takeover, the Church had already been through three stages of building. The first building would be an early Christian church, and its age might be determined by the presence of a mortar floor mixed with bricks. This floor could also be interpreted as one that is paved with tiles that are set on top of a bed of lime (Nallbani & Buchet, 2008) (Hoxha, Përzhita, & Cavallini, 2007). The finding of a window post in the south wall of the apse lends credence to the



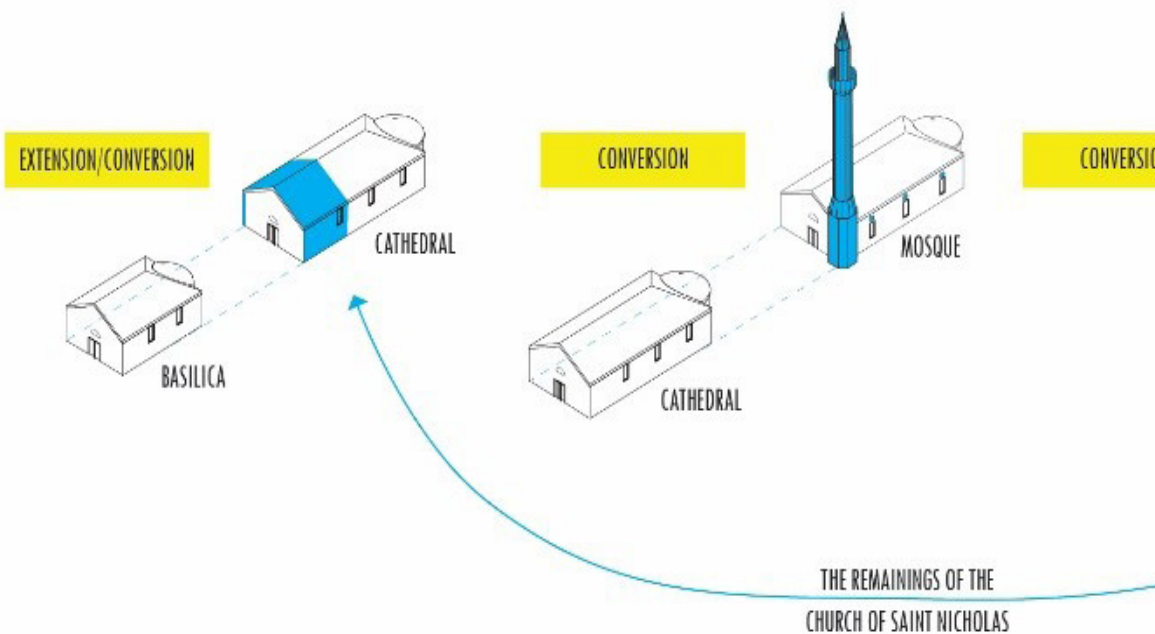
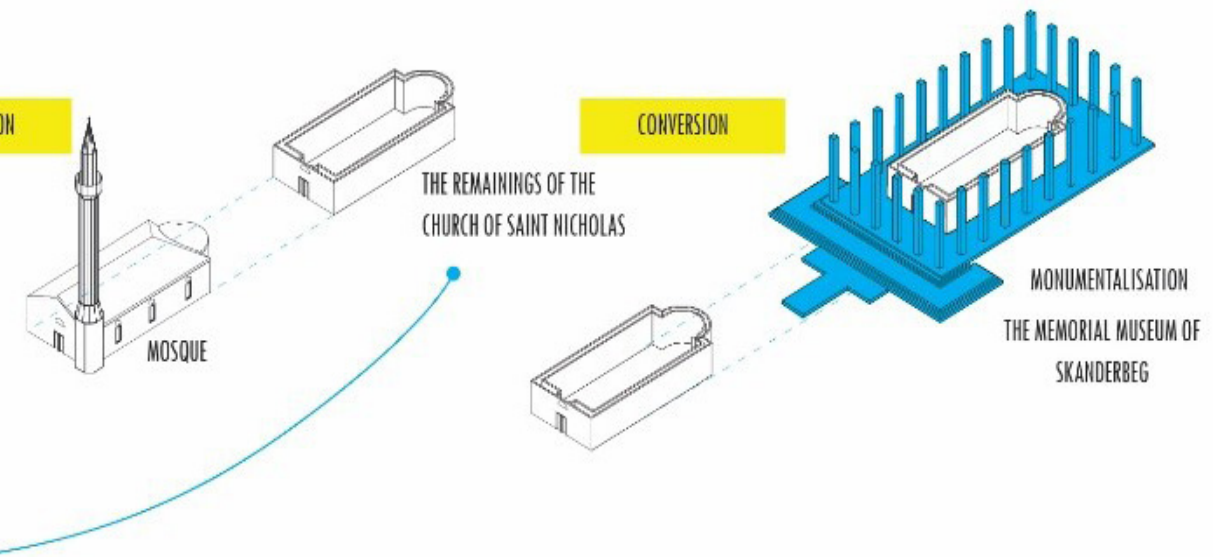


Fig. 2/ Reconstruction of conversion phases, Source Diagram: Author

idea that a second Proto-Byzantine state existed. In conclusion, a final condition would be equivalent to the present-day Church, which was rebuilt in 1457 (Prendi, Iirët dhe Iliria tek Autorët Antikë, 1965) (Hoxha, Përzhita, & Cavallini, 2007). Recent findings from a study that was carried out as part of Brunilda Bregu's research and doctoral thesis in September 2016 have validated the evolution of the site into four separate states. It is also now able to designate phases and examine architectural developments (Bregu, 2016). The first stage is also the oldest, and it corresponds to the location of the oldest site that is still undergoing ongoing archaeological excavation. The second state can be identified by the archaeological remnants of a church apse that was semicircular and opened into a single nave. The investigation of Bregu has made it possible to suggest a primitive plan for the Church with proportions of 8.60 meters in width and 14 meters in length. Only the departure of the apse has been preserved, with its shoulder making an angle to the south. This is because the masonry of the primitive apse was removed in part from the wall of the current apse, which is located to the southeast. A painting that depicts Saint Nicholas that is still visible covers up some of the stonework that was used in this second condition. In the year 1457, the Church was primarily reconstructed, which resulted in the third condition. In addition, it was expanded east, west, and north with a new plan measuring 9.40 meters wide and 20 meters long, which resulted in it becoming

an aid to the fourth condition, which was when it was converted into a mosque in the year 1575. A minaret was constructed in the westernmost part of the structure, and arched windows with six points were cut into both the northern and southern sides. This new construction in the south is not complete without a mihrab. up until the year 1960, it was displayed in this form.

The renovation and transformation of the mosque into a church began in 1987 under the direction of the Institute of Monuments. The appearance of the Church was intended to be brought back to how it appeared in the 15th century by the implementation of these works, which cover all of the brickwork. The west facade received significant alterations. The minaret was taken down, and the southwest corner of the building was dismantled once more. The collapse of the latter Church as well as the earthquake that took place not long afterward caused an imbalance of the facade, which can be seen as a slope of 30 centimeters between the base and the top of the structure (Prendi, Vendvarrimi i Skënderbeut, 1969). Both the northern and southern sashes of the ancient windows were sealed. During the course of the church's repair project, workers unearthed a section of a cobblestone road that dated back to the late ancient period. This finding demanded support to make the remains visible; hence, other adjustments were done to the building when it was declared a cultural monument. The remains were discovered under the apse. The discovery



of a stone structure measuring 2.85 by 1.95 meters that were found in the heart of the Church below the existing level is of the utmost importance. This structure dates back to late antiquity but does not yet have reliable data (Meksi A. , 2007).

The ruins of a church that dates back to the 15th century have been preserved to the present day; however, it appears that only three arched windows on the south wall of the gutter have been preserved. The photographs that can be found in the collection provide evidence that they were damaged throughout the process of transforming the church into a mosque. Because these windows have been retrofitted into the south wall of the gutter, there is a possibility that they were originally part of a church that was built in the 15th century. This has architectural implications for the building (Meksi A. , 2007).

One of Lezha's last medieval buildings, the Selimiye Mosque, was destroyed by Enver Hoxha's regime together with the rest of the city's mosques. Opponents of the Selimiye mosque managed to bring down its minaret (Meksi A. , 2007).

The building's ornamentations were removed, the minaret was dismantled to improve circulation, and the remnants of the original Church were taken down under the pretense that the building's original design had been reinstated. This was accomplished with the aid of a detailed study outlining the adjustments recommended by period architect experts and archaeologists. During those years, when so many houses of worship were

being destroyed, it is puzzling that here, in addition to the destruction of the mosque, efforts were being made to preserve the architecture of the Church of St. Nicholas. Nevertheless, the communist leadership could not ignore the historic significance of the memorial artifacts. As a result, the relic can no longer be utilized for cult purposes, but it may still be venerated as a monument to our national hero's final resting place.

The colonnade built during the communist era is still an important landmark, but unlike the monument, it hasn't undergone any radical makeovers in the previous half-century. Instead, it's only had its marble covering cleaned and repaired as needed.

3. The integrated survey of the Memorial of the National Hero Skanderbeg.

The decision to conduct the survey architecture of the Memorial Museum of Skanderbeg in Lezhe using laser scanning techniques has resulted in a multitude of benefits, including a reduction in the amount of time required for data acquisition and the production of documentation of the museum that is unparalleled in scope. There is not currently any survey that has been brought up to date for the Memorial Museum of Skanderbeg.

We frequently hear about "requalification of the existent" as a turning point for a rebirth of the economy. Following the wild development of recent years, the desire to create from scratch is giving way to a new architectural sensibility that tries to re-evaluate existing places.



Fig. 3 / First Step: Calibration and data collection. Source Photo/ Author, September 2021



Fig.4/ The final point cloud, which contained around 110 million points. Source Diagram / Author

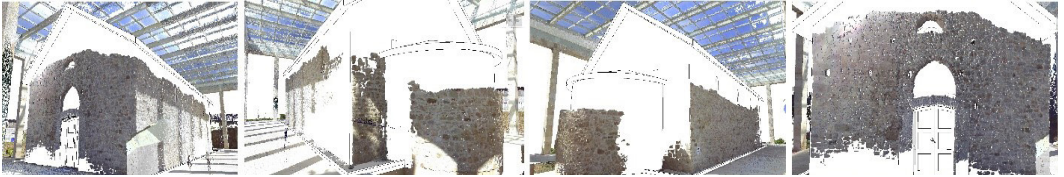


Fig.5 / Overlay of the existing condition and form of the Selimiye Mosque, in Lezha. Source/ Author

The Albanian real estate portfolio comprises innumerable assets of great historical and artistic value that, owing to the present moment of crisis, have not received the care essential for optimal conservation and valorization, and which, in many instances, have been destroyed, closed, and abandoned. Therefore, the use of technological innovations such as the digitization of built heritage has inspired a new modern-day challenge: developing intelligent, efficient, and scalable systems for indexing, archiving, searching, and managing digital collections and related documentation. The spatialization of information based on semantic attributes responds effectively to the needs of documentation and the typical interoperability of interdisciplinary studies, increasing the sharing of resources and the creation of collaborative knowledge. The FARO Focus3D X 120 scanner was utilized during the laser scanning survey that was carried out. To complete the entire view of the monument, six scans were required, which were positioned in six positions of the object, both inside and outside. Because the monument is an object with a regular shape, the scanning process it took no longer than four hours to complete.

Autodesk's Recap was used to insert and interact directly with the model in an environment cad that makes it easy to navigate and measure through an immersive image, while open-source software Cloud Compare was used to create dwg and three-dimensional models in the form.

Archival materials and images of the

monument's primary structures from its two prior stages as a 15th-century church and as a mosque, both of which are absent from the extant object, will be used to generate a reconstruction hypothesis for the last stage of work on the monument. The monument's last phase of construction should be this one.

4. The three-dimensional reconstruction of the monument.

Reconstructing the original appearance of an artifact, as well as the articulation of space and the use of space, in an old artifact that has been subjected to a large number of transformative interventions is always a very complex process. This is especially true when the artifact in question has been altered in several different ways over the course of its history. This third phase, which includes the rebuilding of the monument in three dimensions, is still in the design and development process at the moment. In recent years, there has been a massive growth in the availability of digital technology for conducting 3D surveys of historical buildings and creating virtual models of them. In these kinds of theories, the diachronic perspective, which is intimately related to the developing and complex substance of historical structures, is commonly ignored. On the other hand, virtually reconstructed versions of demolished buildings continue to provide cryptic interpretations, which makes conducting an accurate critical study extremely impossible.

The development of a reconstruction hypothesis of the main structure that is currently in a condition of ruin is the



Fig. 6 / The exterior of the hypothetically 3d models. Source/ Author



Fig.7 / Hypothetically images of the interior of the sacred space. Source/ Author

focus of the final phase of work that has to be done in the museum area before the concept for the completion of the development of a virtual platform can be presented. Restoring the original appearance, articulating the roof, and using the spaces of buildings so old and which has undergone a significant number of transformative interventions is usually an extremely difficult operation. However, reconfigurable hypotheses can be developed if one knows construction logic, can analyze materials, can draw historical analogies, and can compare sources. The production of reality-based models provides basic support for metric, geometric, and colorimetric analyses of the current state of these structures. It is possible to obtain accurate indications from these analyses, even from faint or partial traces, as a result of the information obtained from these analyses.

Traces and photographic evidence were sufficient in the case of the Skanderbeg Memorial in Lezhe, thus an initial possible image could be created from them. These digital models offer the benefit of being able to reproduce objects at any time and verify hypotheses in almost perfect three-dimensional, in addition to allowing for dimensional comparisons with similar structures or conducting analyses of their proportional schemes (especially through their digitization and the production of traditional two-dimensional representations). This is possible because of the model's ability to produce traditional two-dimensional representations.

However, taking into consideration the alterations that the structures have

been subjected to means that the comparison cannot be limited to the state in which they are currently found. Instead, the contribution of the historical documentation that is currently available is required to correctly interpret the remains. The strategy, which will be provided below, has been utilized in the case of the structure that is present in the case of the Skanderbeg Memorial and the Church-Mosque in the Rozafë castle; nevertheless, it can also be useful for other situations that have been researched during the course of this research.

5. Conclusion

Current tools for the digital three-dimensional representation of spatial forms provide a useful resource for the study of architectural history. The given digital representations are very informative in terms of geometric precision, morphological richness, metric precision, and colorimetric correctness since they are proposed to be discretized replicas of the original artifact. Validating the knowledge that is validated by the architectural documentation requires a large quantity of information from a variety of sources, including data in three dimensions. One of the key motivations for writing this essay is to collect data and record the principal case for research that meaningfully depicts the evolution of the Church of Saint Nicholas.

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Fig.8 / Memorial of the National Hero Skanderbeg.
Source/ Author

