Chapter 9

Investigating Baroque Creativity of Minor Examples in Southern Sicily: From Digital Survey to Geometric Interpretation

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ABSTRACT

This study takes advantage of digital surveying to investigate in reverse the complexity and creativity of architectural composition in religious Baroque buildings while studying a so-called minor architecture, the church of Santa Maria dell’Odigitria in Acireale (CT), whose interior is modeled with geometric rigor, through a design process that is based on the use of simple geometric figures but articulated differently, such as to structure a complex structural and proportional order. The three-dimensional space of a computer instead becomes the core of the unveiling process, the place where the scholar has the opportunity to interact and communicate with millions of points gained, to reason on the geometric and spatial qualities of the object; where the geometric intuition about the genesis of the shape can be verified in real time through a simple query / overlap, in which one can move from measurement to representation, from the spatiality of the real to its discretization and viceversa.

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INTRODUCTION

The main and attractive feature of Survey and Representation disciplines is in their being an instrument of control and management of a more or less complex shape as well as a tool for a-posteriori understanding and for clarifying the different design steps through the study of the geometric genesis of surfaces and the close relationship with the constructive design (Docci & Maestri, 2009; Bertocci & Bini, 2012).

Survey critically deconstructs the architectural work by identifying the elements that form the basis of planning, while analyzing the entire spatiality, which is determined not by the simple addition of individual parts but through their composition. Moreover, often time and man’s hand change the identity of the primeval project so that surveying appears to be a crucial step before any choice of restoration that would affect the very essence of architecture.

This study takes advantage of digital surveying to investigate, in reverse, the complexity and creativity of architectural composition in religious Baroque buildings while studying a so-called minor architecture, the church of Santa Maria dell’Odigitria in Acireale (Catania). The interior is modeled with geometric rigor, through a design process that is based on the use of simple geometric figures, but is articulated in complex solutions.

The complexity of such an architectural conception of space leads to apply a holistic approach to understand the essence of the construction. Thus the choice to decompose the geometric investigation according to the various elements that constitute the studied Baroque architecture is functional to the methods of design and construction used in the past. It is also functional to the awareness that each element has to be read and interpreted as a part of a whole and that the “whole is more than the sum of its parts” (Aristotle).

Furthermore, the geometric study cannot be taken out of historical and typological research that can give answers or suggestions to several investigative doubts and can help to understand the connection with the identified formal models of contemporary examples realized in the local and European scenarios.

In particular, we used advanced geometric tools to investigate the geometric genesis of the vaulted surfaces, and the geometric proportional rules that join the individual parts to the whole.

Therefore, the chapter structure follows the outlined methodological approach including: some considerations on the reverse modeling approach to geometric interpretation of historical architectures, followed by an in-depth analysis on the chosen case study with a historical and typological overview, the details on 3D data acquisition and processing, the geometrical study of the planimetric layout, and the geometrical study of the vaults. The chapter will be completed by future research directions and conclusions.

REVERSE MODELING APPROACH FOR THE GEOMETRIC INTERPRETATION OF HISTORICAL ARCHITECTURES

Reverse modeling or reverse engineering is a methodological approach that, in the field of industrial design, describes the transition between a huge amount of geometric data about an object represented by its 3D coordinates – point cloud – and its mathematical description obtained from the numeric model by extrapolating exemplary sections used as directrices and generatrices.

Most of the software for such an “inverse” modelling, starting from point clouds, is provided with a series of two-dimensional (plans and circles) and three-dimensional (cylinders, spheres, cones) graphi-