History, Iconography and Digital Drawing for Architectural Heritage: The Case Study of the Church of S. Nicolò Alla Kalsa in Palermo (Sicily)

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Abstract. This contribution aims to test the efficiency of a research methodology based on an interdisciplinary approach. This is to be achieved through the case study of the disappeared church of S. Nicolò alla Kalsa in Palermo, an imposing medieval building dating back to the thirteenth and fourteenth centuries and demolished after an earthquake in 1823. The reconstruction of the original configuration of this disappeared monument was achieved through traditional research sources and tools in the field of architectural and urban history, as well as architectural drawing, relying on both traditional and up-to-date digital technologies. The main source used for this virtual reconstruction is a rich historical iconography, ranging between urban and architectural scales and decoration details. This led to the elaboration of a 3D model of the lost monument. Some differences and contradictions were noticed in the configuration of the church and its surroundings transmitted by drawings and engravings from the seventeenth to nineteenth centuries. This required an interpretation process in which considerations on building techniques, comparisons of drawings and written sources and confrontations with other coeval buildings concurred to the elaboration of a plausible hypothesis.

Keywords: Historical iconography · 3D modelling · Church of S. Nicolò alla Kalsa

1 Reconstructing the History of a Disappeared Monument, Between Clues and Riddles

1.1 Introduction

Processes of growth and transformation of old cities often caused the renewal of entire comparts of the urban fabric, which sometimes also involved the demolition of relevant monuments. Even in instances where these are totally disappeared, drawings, engravings, written descriptions and other sources are witnesses of the past existence and the material aspects of such monuments. These testimonies enable scholars to study lost monuments and elaborate their hypothetic reconstructions through digital and virtual tools. However,

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the results of such processes cannot be just a summation of data. Instead, it is needed the interpretation of the sources from different viewpoints, especially the historical iconography. In fact, it is well known that all source types and especially images provide scholars a specific vision or interpretation of the subject they "relate" to (Ackerman 2003). More or less consciously, they transmit an information which might be significantly distant from the object they deal with. In the field of architectural heritage, the intertwining of competences of architectural historians and drawing experts can produce an effective combination to detect mystifications, leading up to reliable solutions.

This contribution focuses on the church of S. Nicolò alla Kalsa in Palermo, a disappeared imposing medieval church whose characteristics and overall conformation can be reconstructed from different sources, especially the iconographic ones. This case study is particularly relevant from a methodological perspective, because of the variety and incongruences of the sources at disposal. The applied methodology developed through the following steps. Firstly, a literature review was conducted to trace the state of the art both on the study of the church and the methodological issues. It followed the gathering of data from written sources, including material and morphological data from the historical iconography which were then all compared and contrasted. All the incongruences from the examined recorded sources were discussed by the authors, who contributed to this research by providing different viewpoints reflecting their expertise. Furthermore, the comparison with other coeval buildings in the same geo-cultural context also contributed to the solution of the case riddles. This resulted in a 3D model created with the contributions coming from the whole described process, which was also a step-by-step instrument of verification of the formulated hypothesis.

1.2 Notes on the History of the Church of S. Nicolò Alla Kalsa and Its Configuration

Located in the Kalsa district within the old city, the church foundation seems to date back to the thirteenth century (Fig. 1). The oldest known archival document referring to construction issues is the purchase of a big area in 1306 by Giovanni Chiaromonte, testifying his intention to build a burial family chapel attached to the church of S. Nicolò alla Kalsa (Palermo 1858:333; Spatrisano 1972). This suggests that the church was already existing at the time. Unfortunately, no other relevant sources have been found on the eventual transformation and additions to the original building during the medieval period. Other documents provide information on the attention paid to the church by the local community in a long span of time, ranging between the fourteenth and nineteenth centuries. Parish church since its foundation, it was assigned to the nearby hospital of S. Bartolomeo as a place of worship around 1321, probably creating a direct connection between the two buildings. Since 1520, the church was also the seat of the Holy Sacrament brotherhood who had in use a chapel and some rooms attached to the main building around 1573 (Salemi 1870: 36).

The church was also the location of official ceremonies celebrated at the presence of the viceroy in different occasions since the sixteenth century. Moreover, it was declared royal chapel one century later by the viceroy Fernando Afán de Ribera (Palermo 1858). During the early modern period, some interventions are known to have significantly changed the church interior appearance as well as its façade. Especially relevant are those

Fig. 1. (left) Gaetano Lazzara, *Plano de la ciudad de Palermo*, 1703; detail (Nobile 2003).

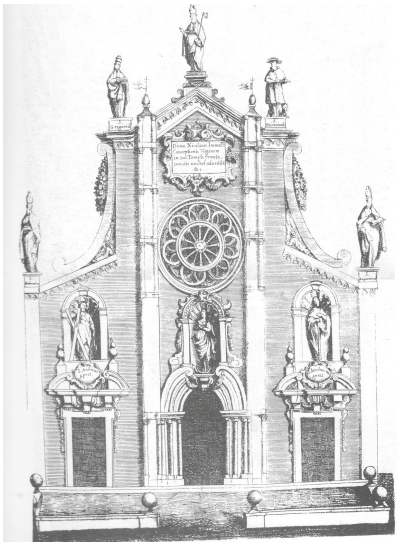

Fig. 2. (right) Façade of the church of S. Nicolò alla Kalsa, engraving, 1660 (Vetrano 1660).

commissioned by the parish priest Francesco Vetrano in 1654 to match the architectural trends of that time. The changes included the insertion of sculptures and stucco works, the opening of two side portals on the façade (Fig. 2) and wider windows to enlighten the nave (Vetrano 1660). However, it seems that the church lost its importance during the eighteenth century, as it testifies an attempt by the prince of Trabia to demolish it in the sixties to enlarge his palace (Mazzè 1979: 246). Finally, the damage of the building produced by an earthquake in 1823 offered the pretext for actual demolition of the church (Salemi 1870: 33). This sudden intervention was not exempt from criticism and controversy, in a cultural climate that had already started a process of revaluation of the medieval architecture in the island capital. It was especially the scholar Agostino Gallo who denounced this "barbaric" action and commissioned an artist a "survey" of the church (Salemi 1870: 33). The production of the historical iconography which followed was due to the regret for the missing monument and probably also due to intentions of a potential reconstruction. The examination and comparison of the drawings, to understand their "sequence" and reciprocal relations and till what extent they can be considered a reliable source, will be done in the next chapter.

Now we want to focus on some aspects of the medieval church configuration emerging from the intertwining of different kind of sources and the comparison to other contemporary churches.

A manuscript by Antonio Mongitore from the eighteenth century provides a description which informs on the overall dimensions and the number of columns in the church

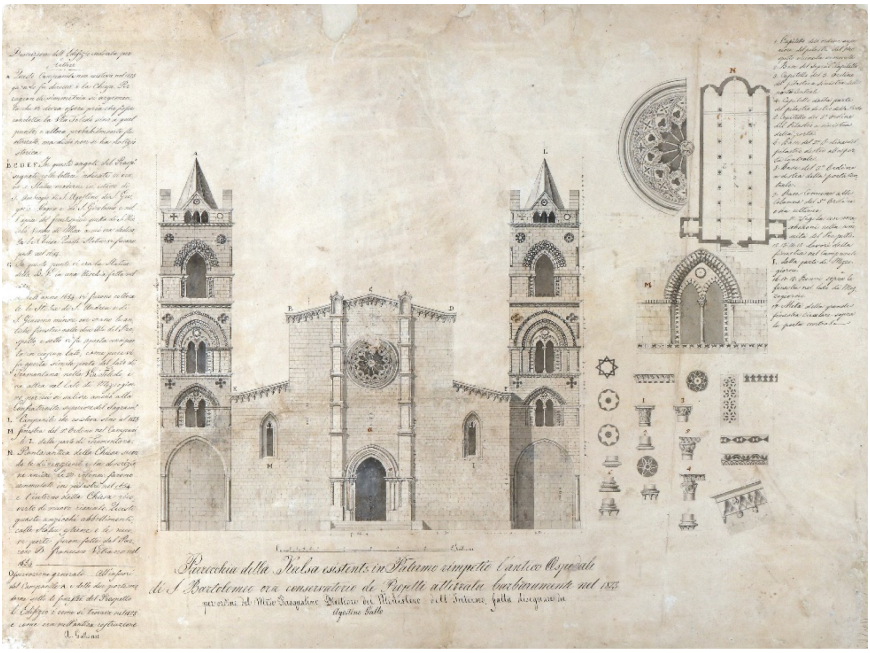

Fig. 3. Anonymous, church of San Nicolò alla Kalsa in Palermo, around 1835 (Galleria Regionale della Sicilia di Palazzo Abatellis).

basilica plant. These data are quite coherent with the schematic plant reproduced in the iconography documenting the building after its demolition (Fig. 3) and the religious architectural trends in Sicily at the time of foundation of the church (thirteenth century). The main terms of comparison to take into consideration are the churches of the mendicant orders, especially those of S. Francesco d'Assisi and S. Agostino in Palermo, in their original configurations. Although the basilica type with thin columns to divide nave and aisles was no longer widespread in the "age of Gothic", a different trend was observed in Sicily. The trend showed some continuity with the previous century and the models offered by the main cathedrals founded by Norman rulers, which kept for a long time the role of reference models even in the early modern age (Nobile 2009). The semicircular apses in the presbytery, the design of the portal and the detail of the cornice on the façade, as well as the decoration with lava inlay in the bell tower, they all correspond to the same models, as reproduced in the nineteenth century's plates (Figs. 3, 4 and 5).

About the latter, the hypothesis of a double bell tower (Fig. 3) appears absolutely unlikely, especially considering its position which is not aligned with the façade. The very orderly building aspect transmitted by the historical iconography finally contrasts with the known data about the existence of private chapels attached to the church, especially the Chiaromonte's one (Sardina 2003). Probably these were irregular in form and dimensions. It indirectly confirms the schematic value of the church plant representations.

2 The Iconographic Sources Analysis

The first iconographic source under analysis is a plate from around 1835 (73.2 × 57 cm) in pen and watercolor, kept at the Galleria Regionale della Sicilia di Palazzo Abatellis, commissioned by Agostino Gallo, as written down in the plate full title. It includes various drawings of the church, with notes on dimensions and letters which refers to the accurate descriptions in the legend (Fig. 3). The plate central part shows the façade drawing with a portal with side columns, an imposing rose window on top and two buttresses on seven levels. In correspondence to the side aisles, there are represented two single-lancet windows with ogival arches and a trilobate fretwork decoration in the upper part. A graphic scale in Sicilian *canna* is found at the base of the façade. Differently, the plate right part shows a three-nave plan with three apses. There are also reported details of the following: half the rose window, a mullioned window from the second order of the north façade of the right belltower, the buttress bases and capitals, the cornice with masks outlining the façade top part in correspondence to the three naves, as well as bands and two-tone discs of the right belltower decoration. The mullioned window of the second order on the belltower north face (orthogonal to the main façade) is marked on the drawing and found in the legend under the letter "M". Such representation on the plate can be possible only if the author saw it in real life and surveyed the church. Hence, this would suggest that the plate author is the same as the one of the drawings in Figs. 4 and 5 discussed below.

On the church side, there are two belltowers, set back from the façade edge. The second belltower, as specified in the legend, did not exist in 1823. However, the draughtsman hypothesizes that this must have been present in the ancient building for symmetry reasons. The whole plate represents the church configuration before Baroque changes. Even the plan has an ideal layout, it confirms the overall dimensions reported by Mongitore (22 *canne* in length, 9 in width, measured from the inside), who however also mentioned the chapels which are missing from the drawing of the plan. The comparison between the plan and façade reveals some inconsistencies as the aisle dimensions do not seem to match. The façade appears dilated and disproportionate.

Another table in pencil and watercolor (37.5 × 32.3 cm), kept at the same institution, shows the drawing of the church façade. This represents in one half the church Baroque configuration and in the other half an attempt to report the church potential ancient aspect (Fig. 4). The pencil inscription on the top classify it as study drawings. The draughtsman uses a sort of central perspective to show the belltower two faces (north and west), which would not have been both visible if drawing with a flat view.

Given that the belltower is represented in its real features, it can be assumed that the drawing right half is a sight survey. This is because, on one hand, it provides the image of the north belltower. On the other hand, it shows the bell in the belltower, although this is not represented in the plate in Fig. 3. For the discussed reasons, Fig. 3 could be considered the ideal reconstruction of the church original configuration. It is plausible to assume that the plate in Fig. 4 is a real-life study which is prior to the final plate drafting in Fig. 3, where the same measurements are reported. There are also reported the mullioned window of the second order of the north face belltower and the same fragment of the cornice with masks.

Fig. 4. (left) Anonymous, *Chiesa parrocchiale della Kalsa a Palermo diroccata nel 1823*, nineteenth century;

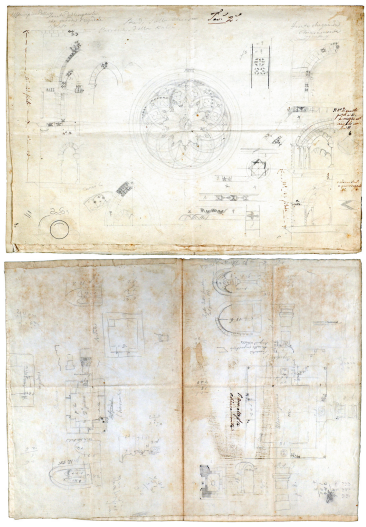

Fig. 5. (right) Anonymous, *Studi sulla Chiesa e Parrocchia della Kalsa,* nineteenth century; (Galleria Regionale della Sicilia di Palazzo Abatellis).

Moreover, the drawing in Fig. 4 might be by the same author who also drew the pencil sketches on both the paper sheets (55.5 × 35 cm), also kept at Palazzo Abatellis. On the panel, it is read "Studi sulla Chiesa e Parrocchia della Kalsa" (Fig. 5). The author might be the same artist hired by Gallo to draw the plate in Fig. 3 (Salemi 1870: 33). The sketches report dimensions and other detailed information that could not have been deduced from other people's drawings. For this reason, they appear as survey sketches. The front sheet contains a rose window drawing constructed geometrically with a ruler and compass, as if it was a preparatory study for a final drawing. On the paper sheet sides, the belltower north and west façades are drawn in half and by freehand. These are labelled with the letters "x" and "y", as in Fig. 4. On the north façade, it is drawn the same mullioned window identified with the letter "M" in the plate in Fig. 3, mentioned above. At the bottom, a ruler and compass were used to draw a very high lancet arch of a mullioned window, which is not clearly identifiable with its two-coloured decoration. The sheet also contains details of the belltower decorations, some of which are represented as well in the plate in Fig. 3, named with lower case letters and identified on the sketches.

On the reverse side of the same sheet, there are dimensioned survey sketches of the tower four level plans. From these, it is deduced that the top floor openings were mullioned windows, except from the one on the west side. On the sides of three plans, there are details of the bases and capitals of the mullioned window central columns, as well as the window outlines and the section of the cornice with masks. On the drawings are found information and details on the number of rows or ashlars.

The author and circumstances of the fragmented and incomplete iconographic material at disposal are unknown. Hence, this required an interpretation process involving an attentive analysis of all graphic signs and annotations, a constant drawing comparison, with continuous cross-checks from one work to another for confirmations (Bertocci and Bini 2016). Such analysis led to these hypotheses: the drawings (Figs. 3, 4 and 5) kept at the Galleria Regionale della Sicilia di Palazzo Abatellis belong to the same author; Figs. 4 and 5 represent the sketches and drawings of the church survey commissioned by Agostino Gallo and the plate in Fig. 3 is an ideal reconstruction of the church original configuration, as deduced from the survey interpretation. Such hypotheses are based on the currently available drawings and might be either disputed or confirmed by further investigation or the discovery of other currently unknown documents. These hypotheses supported the church virtual reconstruction, discussed in the following paragraph.

3 The 3D Model: A Tool for Verification and Graphic Restitution

The 3D model is the result of hypotheses from the source study, analysis processes and knowledge on the lost monument. The virtual reconstruction regarded mainly the building overall volume, the composition of the main façade and the belltower faces, which excluded transformations and elements from the Baroque period. Similarly, to Fig. 3 drawing, the digital model hypothesises the church configuration from the fourteenth century. A second belltower is only included as an outline, as its existence was highly unlikely. Such iconographic source critical interpretation was used for the graphic restitution process. The façade proportions derived from processes of drawing analyses and comparisons (Fiorillo et al. 2013). It is noticed an evident horizontal deformation in the façade from the comparison of the 1835 drawing (Fig. 3) with potential real-life studies of the façade itself and the belltower (Figs. 4 and 5). Compared to the façade in Fig. 3, the dimensioned survey sketches show a smaller width of the shape. This seems to be confirmed by a façade drawing commissioned by the parish priest Vetrano, transposed in the engraving published in 1660 (Fig. 2). Although this particular drawing representation type is less technical and usually cannot be trusted on its proportions, the redrawing of the engraving main lines shows significant affinities especially with the analysed drawing in Fig. 4. These regard the façade overall development and the nave width. A comparison with contemporary architectures allowed a better understanding of the proportions on the redrawing. Specifically, the church of S. Francesco d'Assisi in Palermo was helpful, due to crucial affinities with the church S. Nicolò alla Kalsa. In fact, the analysis of the Franciscan church façade (Fig. 6) seems to confirm the hypothesised horizontal stretching of the façade image in Fig. 3. Thus, a contraction of the façade width appears more likely than the one in the known drawing.

Nonetheless, the comparison with the decorative motifs on the façades of the Franciscan and the Augustinian churches in Palermo confirmed the reliability of the decorative details in the nineteenth-century iconography on the church of S. Nicolò alla Kalsa. Moreover, no strong inconsistencies were found on this aspect in the different drawings, except from some details in the central rose window. Therefore, the drawings and especially the detailed plate in Fig. 3 provide a clear and precise abacus, incorporated in the 3D model.

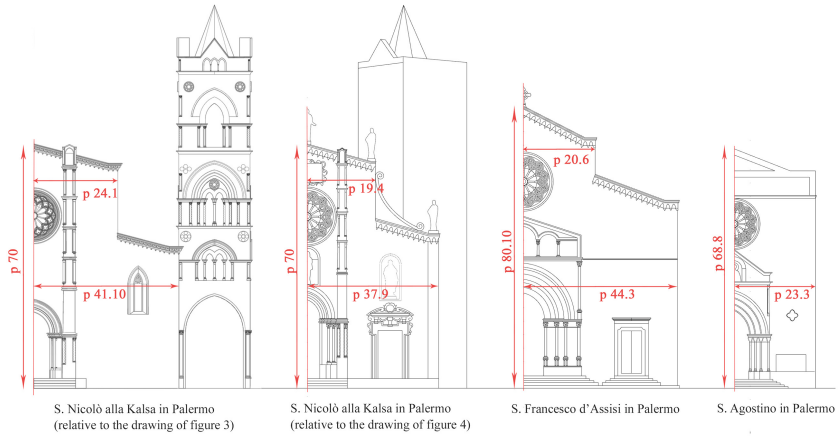

Fig. 6. Study on the proportions of the façades (units of measure in Sicilian palms and ounces): comparative diagrams of the churches in Palermo. (from left) Churches of: S. Nicolò alla Kalsa, S. Francesco d'Assisi and S. Agostino.

Finally, the S. Nicolò alla Kalsa church three-dimensional graphic reconstruction was based on a redrawing process of the version illustrated by the plate commissioned by Agostino Gallo around 1835 (Fig. 3), minus the second belltower and with some of the corrections in the façade overall proportions above described.

4 Conclusions

The digital model shows the medieval building overall volumetric composition, the façade drawing and the belltower faces. The scarce information available, which often consist in only laconic descriptive notes, could not in fact support a broader reasoning on the articulation of the building internal space. As previously noted, the planimetric layout in the nineteenth-century plate (Fig. 3) illustrating the church characteristics is decidedly schematic. This provides no indication on the side chapels, whose existence is testified by written sources, especially the cited manuscript by Antonio Mongitore.

The CAD software used for this graphic restitution is a Mc Neel technology. The procedure involved the export of the façade drawing in a 3D work environment (Migliari 2003). The drawing accuracy derived from the façade perfect orthogonal projection in the drawing used as a base. This allowed no perspective deformation which could have compromised the proportion correctness.

Then, it followed a construction for NURBS surfaces of the drawing planes until the complete solid reconstruction of the form (Fig. 7).

The process here illustrated can be applied to other case studies, documented trough similar sources, and demonstrates the importance of a deep analysis of historical iconography for a correct and plausible graphic restitution.

Fig. 7. The church San Nicolò alla Kalsa digital reconstruction. View of the main front; the second belltower -included in the plate of Fig. 3 - is transparent, considering its actual existence highly unlikely.

Authors' note: All contents were shared among the authors; however, paragraph 1 is attributed to Emanuela Garofalo, paragraph 2 to Vincenza Garofalo and paragraph 3 to Laura Barrale.

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