3D digital modelling as a method for the reconstruction of the historical image of the city: the case of piazza Bodoni in Turin (Italy) at the end of nineteenth century

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AntiCIPAting the future of the cultural past

Zappeion Megaron
Athens, Greece
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Volume 1

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3D DIGITAL MODELLING AS A METHOD FOR THE RECONSTRUCTION OF THE HISTORICAL IMAGE OF THE CITY: THE CASE OF PIAZZA BODONI IN TURIN (ITALY) AT THE END OF NINETEENTH CENTURY.

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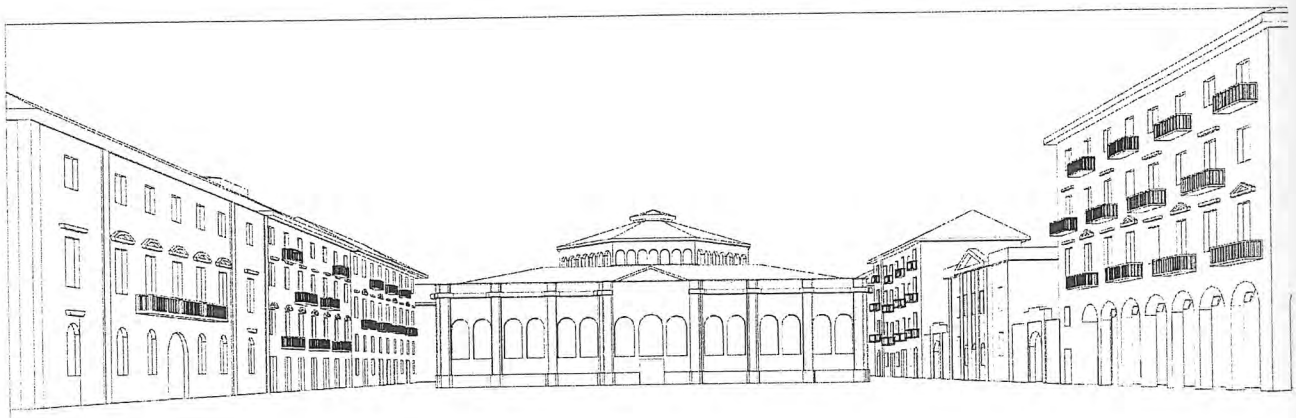
KEY WORDS: Architecture, Digital, Modelling, Reconstruction, Research, CAD, Representation

ABSTRACT:

The experience that I want to present consists of the case of piazza Bodoni in Turin, characterized, between 1866 and 1924 by the presence of an original pavilion dedicated to market.
The 3D digital reconstruction allows to recognize the role that the building of the market plays in the characterization and identification of this specific urban location as an essential element in the image of the city.
To reconstruct the architectural and urban morphology of the place, I have conducted researches on iconographical records of the urban setting and of the historical market at the Turin city archives. In my researches I discovered a large number of tables, consisting of city plans of the area and architectural designs of the buildings around the square.
The research project was also based on other information culled from period photographs sources in others archives and in bibliographic sources.
The rich iconography that emerged from the archival records has enabled me to address the research to an attempt to simulate the activities of market that existed historically within his specific location.
The data drawn from historical-archival and bibliographical sources were compared and integrated with the planimetrical and altimetrical survey, prepared by me, of still existing buildings.
I designed the virtual piazza Bodoni with its market, consisting in a closed pavilion that was demolished in the 1920s.
The 3D perspective visualizations of the square, revealed an image that reminds the paintings of the "ideal cities" of Italian Renaissance.



1 TO RECONSTRUCT FOR RECOGNIZING IN THE PRESENT THE HISTORICAL IMAGE OF THE URBAN FABRIC.

"... to reconstruct means to collaborate with the time in his shape of 'past', to pick up the spirit or to modify it, to stretch it out, almost, towards a longer future, means to discover under the stones the secret of the springs..."
Marguerite Yourcenar, Mémoires d'Hadrien, 1951

The reconstruction of the historical images of a urban fabric, as well as of buildings or complexes, allows viewing through its present aspect the different looks it had in the past, and recognizing their traces.
Thanks to digital modelling it is possible to go back in the time and to recover images of places today modified.
Besides thanks to digital modelling, the 3D visualization of the morphological transformations of the urban fabric in various historical periods makes it possible to share this information and diffuse it in a readily understandable form to a wide-ranging spectrum of public.
The urban setting of "piazza Bodoni" in Turin nowadays appears to the visitor as an unitary composition of buildings of the second half of nineteenth century, characterized by homogeneous style and, on the southern side, by a continue curtain with arcades.
Only one building, on the southern-eastern side of the square, shows as a contemporary architecture of the second half of the twentieth century.
As a matter of fact, another building on the eastern side of the square, the Conservatoire of Music of Turin, had not origin in the same period of the other buildings of the urban fabric.
It was built at the end of 1920's, in place of a not very well-know building, sometimes described as "octagonal pavilion",

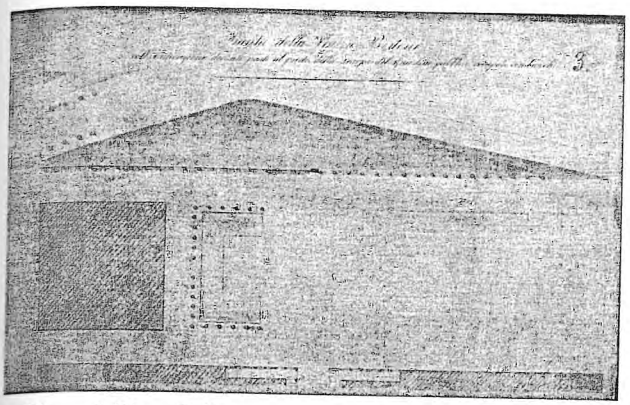


Figure 1. Plan of piazza Bodoni with the shed of the market in the half of nineteenth century
(ASCT, Tipi e disegni, 15.5.126/3)

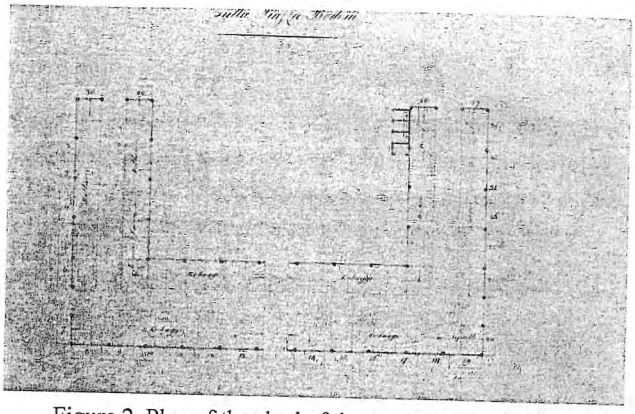


Figure 2. Plan of the shed of the market in the half of nineteenth century
(ASCT, Tipi e disegni, 15.5.126/2)

demolished in 1924.
It was a closed pavilion, built between 1864 and 1866, in function as market and public wash-house.
It originated along with the urban setting it had been inserted into. Its location was one that was originally in the outskirts of the city, along the town's southern barricades.The space was cleared when the eighteenth-century walls were knocked down.
As is documented in some archival records, the activities of market in this place preceded the construction of the pavilion. In the half of the nineteenth century on the western side of the square there was a U-shaped shed, for the wholesale of fruits and vegetables and, on the northern side, forty moveable stands (figure 1).
An iconographical record of the shed (figure 2) shows the distribution of the 65 stands under cover and the merchandise sold (vegetables, legumes, flours, cheeses, butter, poultry, lambs, fishes, cooked foods).
Around the shed there were other 30 stands.
A record of 1857, together with a historical view (figure 3), supports by document the presence in the square of pedlars of vegetables, eggs, poultry, butter and fruits.
In 1863 the Municipality deliberated the building of the new pavilion, on the eastern side of the square, to replace the old shed.
The engineers Edoardo Pecco and Carlo Velasco designed (1864-1866) a square-shaped building surmounted by an octagonal drum (figure 5).

The report and the drawings were published in the magazine "Il Giornale del Genio Civile"(1865) in which it is affirmed that the nearly finished building "is good for the beauty and for the regularity of the square".
The pavilion was built on two floors: on the ground floor there was the market with 300 ring-shaped fixed structure of the stands, on the underground floor there were the public wash-house and 180 stock yards.
It was built with bricks and stones walls and covered by wood, iron and cast iron structure.
In the market were sold: meat, poultry, butter, eggs, tripe, cheeses, pasta, fishes, fruits and vegetables.
In 1888 an extraordinary snowfall caused the fall down of the roof; the structure was rebuilt completely in metal by design of Carlo Velasco (figure 7).
In 1893 the interior of the pavilion was modified: the number of stands was reduced from 300 to 118 (with different distribution), and two large stock yards were built (figure 6).
In 1924 the Municipality deliberated the demolition of the pavilion.
The 3D digital reconstruction allows to recognize the role that the building of the market plays in the characterization and identification of this specific urban location as an essential element in the image of the city.
To reconstruct the architectural and urban morphology of the place, I have conducted researches on iconographical records of the urban setting and of the historical market at the Turin city archives.

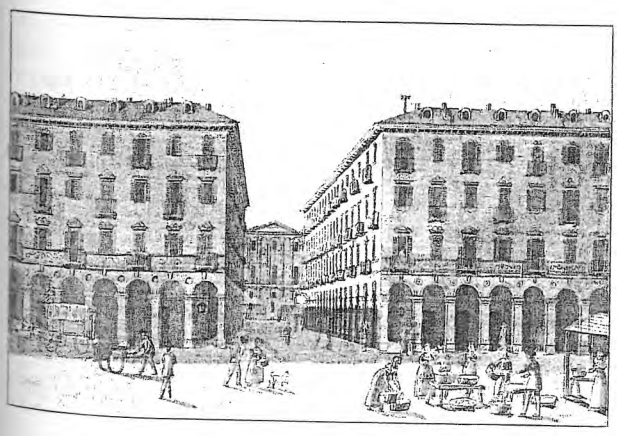


Figure 3. Marco Nicolosino, view of piazza Bodoni,
(ASCT, Collezione Simeom, D 238)

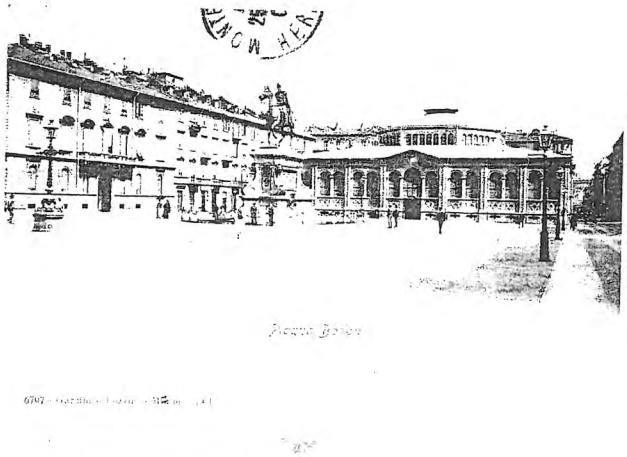


Figure 4. Piazza Bodoni in an old postcard, (1904)

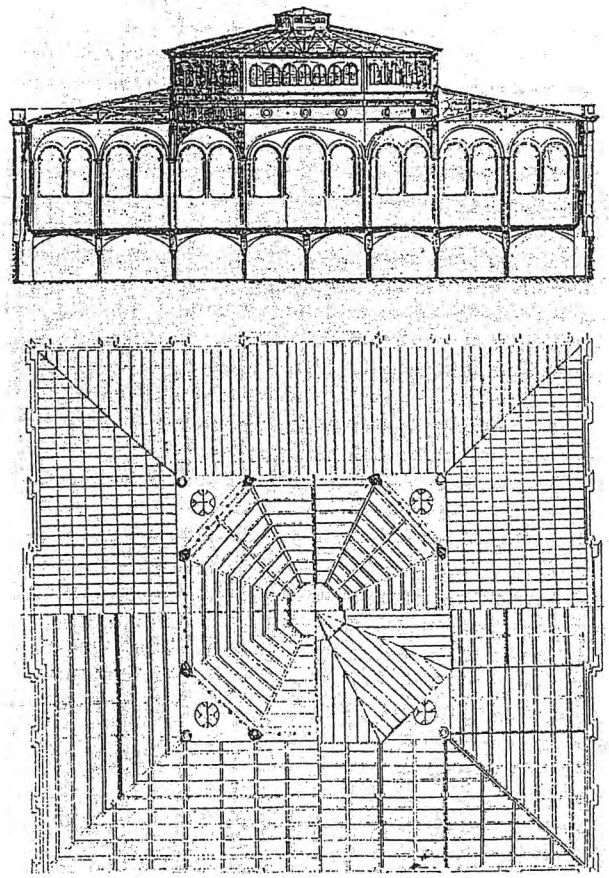


Figure 5. Pavilion for market and wash-house,
("Il Giornale del Genio Civile", 1865)

In my researches I discovered a large number of tables, consisting of city plans of the area and architectural designs of the buildings around the square.
On the bases of archival records it was possible to reconstruct the shape of the urban fabric with the pavilion between 1893 and 1924 (figures 8-9).

The research project was also based on other information culled from period photographs sources in others archives and in bibliographic sources.
The rich iconography that emerged from the archival records has enabled me to address the research to an attempt to simulate the activities of market that existed historically within his specific location. The data drawn from historical-archival and bibliographical sources were compared and integrated with the planimetrical and altimetrical survey, prepared by me, of still existing buildings.

2. 3D DIGITAL MODELLING FOR VISUALIZING THE HISTORICAL RECONSTRUCTIONS.

The reconstruction of the historical evolution of a urban fabric allows viewing through its present aspect the different looks it had in the past, and recognizing their traces.
Francesca Cataliotti wonders about the purpose of such studies, and suggests possible answers. "Why reconstruct? Perhaps is it possible to restore the identity, the sense of *unicum*, by adding up fragments and appearances?
We reconstruct because of a sort of intellectual pleasure which the architect cannot do without, because of the necessity to satisfy that romantic taste of reviving, if only on the drawing board, the original shape of the ancient monument, in order to understand what has disappeared, in part or whole,... or, perhaps, is it the architecture itself that asks to be represented in order to be understood and enjoyed at a distance, in time and space?
The reconstructive representation is, first of all, a way to understand the object and could become an important tool of historic and iconographic research...". (Cataliotti, 2001)
3D digital modelling offers in this respect a powerful method of checking hypotheses. Notes Gabriele Rossi: "in a 3D digital model, the complexity of the representation gives way to an illustrative schematization which has, in any case, better spatial control of the object and far exceeds the traditional static axonometric and perspective forms of representation.
The model thus becomes an essential tool to check and control the validity of reconstructive hypotheses". (Rossi, 2000)

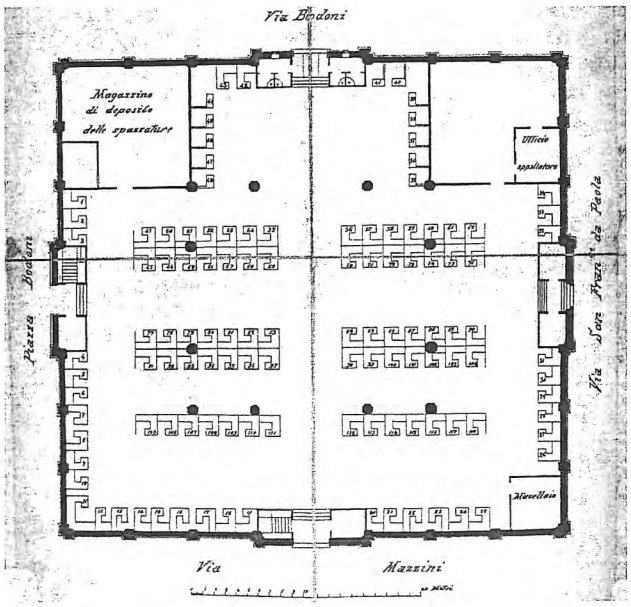


Figure 6. Plan of the ground floor of the market, after 1893,
(ASCT, Collezione Q XIV, n. 5, lotto VIII)

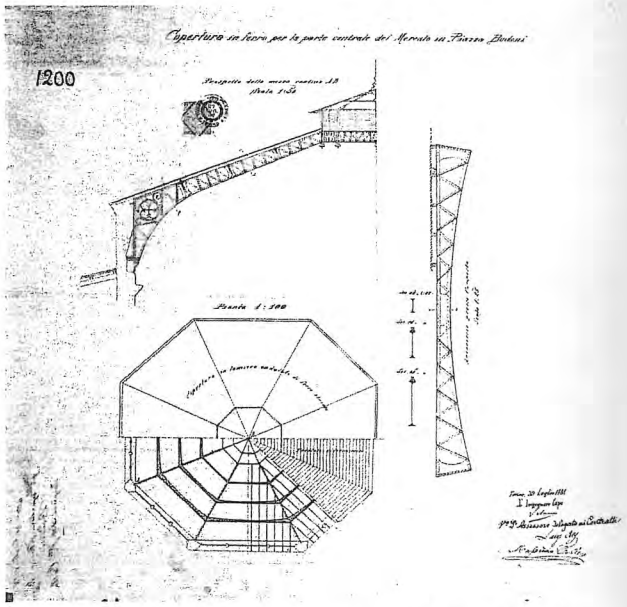


Figure 7. Carlo Velasco, structure of the roof, 1888
(ASCT, Tipi e disegni, 15-5-63)

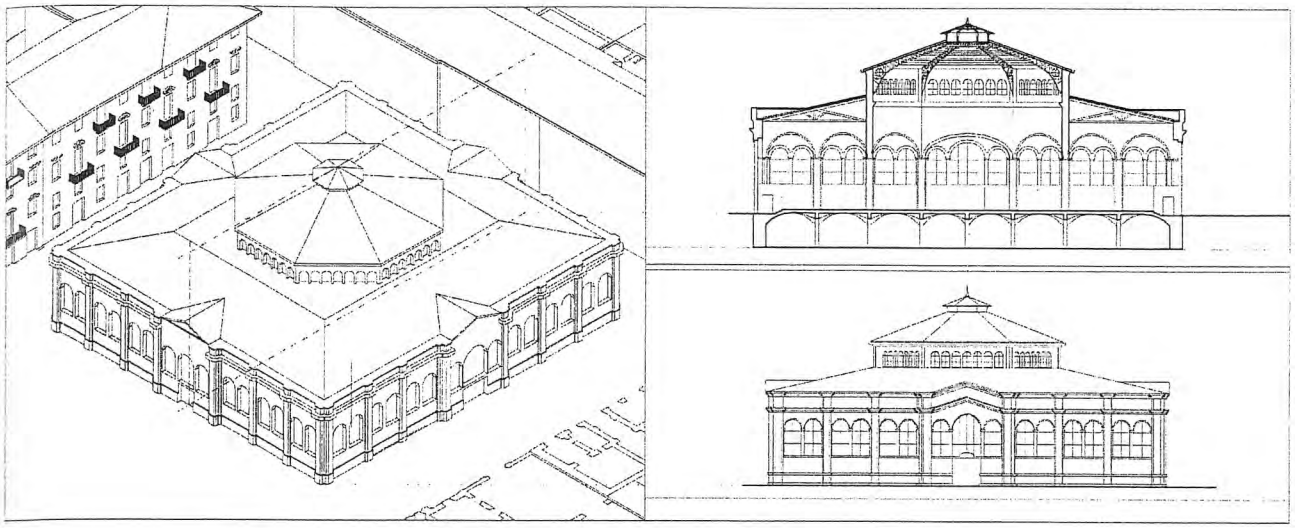


Figure 8. 2D and 3D reconstruction of the pavilion for market and wash-house,
(Drawing and model by Roberta Spallone)

3. 3D DIGITAL MODELLING AS A TOOL FOR KNOWLEDGE.

3D digital modelling, a technique of representation by now widely consolidated in the various design phases, is presently stirring a renewed interest for the survey of existing structures.
This is, on the one hand, due to the natural connection with the most innovative methodologies of instrumental survey. On the other, it is a consequence of the wide-ranging potential applications in the fields of critical thematic analyses and of spatial and temporal simulation: "*digital mock-ups* [...] allow a richer and more controlled interaction between user and model [...] *digital mock-ups* are able to cover, within a unique representation system, the entire range of possible modelling". (Maldonado, 1992).
The quick evolution of digital technologies, hardware and software, makes it ever easier to build 3D models of considerable geometrical complexity.
A critical selection of data, first of all in respect of the relationship between scale and contents of the representation, is absolutely essential to avoid, in the modelling phase, very complex procedures adding insignificant detail which uselessly increases the size of the digital file. In this respect it should be considered that the most suitable support for the visualization of the model in its space-time dimensions usually is the monitor of a personal computer.
While 2D digital drawings now usually implement a level of detail that is greater than the level achieved, for the same scale of reduction, in a traditional drawing, it is most appropriate to simplify 3D digital modelling by implementing primitive solids, by analogy with material plastic modelling.
3D digital modelling complements drawing as an information and communication tool, while adding, as a specific prerogative, the possibility to enter the fourth dimension.
This important aspect is underlined by Claudio Moriconi, who observes that "with the digital support the drawing simulates the hypothetical reality, overcomes static limitations and allows interacting with any kind of sign.
By creating virtual images, digital graphics is probably the most suitable tool to interpret the complexity of reality [...]". (Moriconi, 2001)
The creation of a 3D digital model offers, as a result, infinite possibilities of observation: from the objective visualization of a cylindrical projection, to the subjective visualization of a conical projection. In this respect Mario Docci and Riccardo Migliari state that: "modelling is not only a creative strategy, but also a cognitive one. Digital models allow 3D simulations... Computerized models are conceived as 3D systems, real *maquettes* that live in a virtual space perfectly corresponding to a real space, so much so that they encompass all four dimensions. They are visible through a screen, a window (which reminds the window of Alberti's *perspectiva artificialis*). This window visualizes the models in a 2D space that can be perceptive (in a central projection) or measurable (in a parallel projection), with the capability to vary the point of view so as to simulate the mobility and the transformability in time and appearance". (Docci, Migliari, 2000)
The urban fabric of piazza Bodoni characterized, between 1866 and 1924 by the presence of an original pavilion dedicated to market, was a test case of the potential of 3D digital modeling for the historical reconstruction.
Thanks to digital modelling, the 3D visualization of the morphological transformations of the urban fabric as well as of buildings or complexes in various historical periods makes it possible to share this information and diffuse it in a readily understandable form to a wide-ranging spectrum of public.
"The digital techniques of representation make it possible to create a picture of the situation before and after the intervention, and to rebuild, if necessary, the stratification too.
The era of graphic papers that only the specialists can decipher is over. Now the very users of a building or of an urban complex can appreciate spaces [...] before during and after its irreversible transformation". (Moriconi, 2000)

4. INTEGRATED METHODOLOGIES OF ANALISYS: FROM ARCHIVAL, ICONOGRAPHICAL AND BIBLIOGRAPHICAL REASEARCHES, TO DIRECT METRICAL SURVEYS, TO 3D MODELLING.

The reconstruction of the evolution of the buildings required the geometric modelling of the exterior. This was based on data drawn from historical-archival, iconographical and bibliographical sources integrated with the recent planimetrical and altimetrical survey by Roberta Spallone (Calorio, Spallone, 2001), and additional measurements directly taken in a survey of the exterior.
3D digital modelling required a critical selection of the data

with the goal of simplifying the representation of the geometrical external shape, of the buildings. For the reconstruction of the demolished pavilion, based on a work published in a historic magazine (Giornale Genio Civile,1865), on archival iconographical records, on archival photographs (FondazioneTorino Musei, Fondo Gabinio).
The AutoCAD 2006 software package was used for the preparation of the 3D digital model, for different visualizations and for renderings.
The model was used to produce a set of axonometric and perspective views of the exterior.
The 3D perspective visualizations of the square, revealed an image that reminds the paintings of the "ideal cities" of Italian Renaissance.

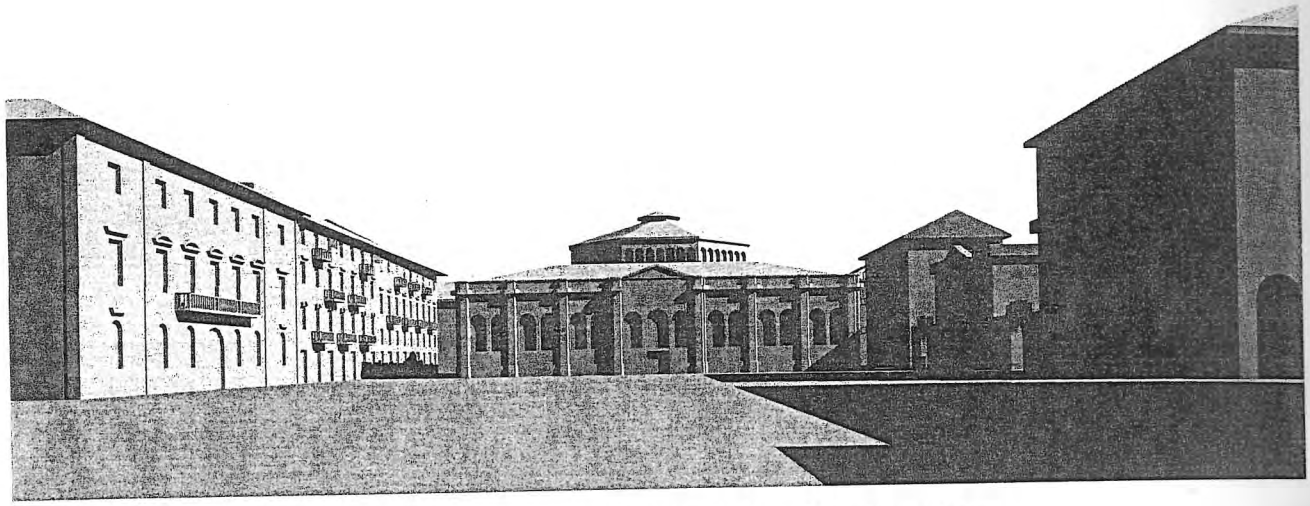


Figure 9. 3D reconstruction of the pavilion for market and wash-house, (model and rendering by Roberta Spallone)

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