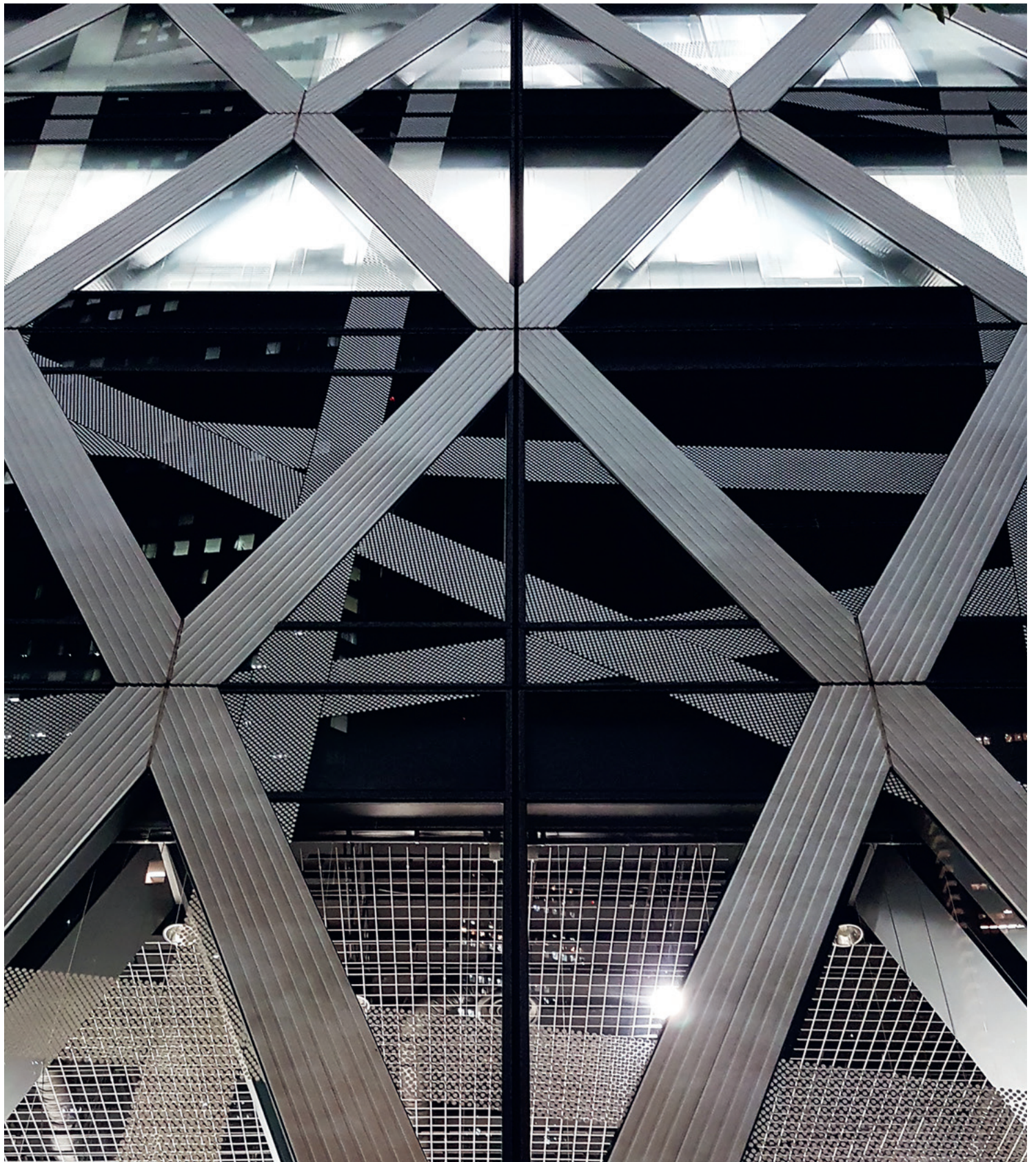




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THE HISTORICAL MEMORY OF FAZENDA SANTA MARIA DO MONJOLINHO IN SÃO CARLOS

Cristiana Bartolomei, Alfonso Ippolito, Davide Mezzino,
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Abstract

Fazenda Santa Maria do Monjolinho, located in São Carlos, São Paulo, is a testimony to Brazil's rich agricultural history and, particularly, to its pivotal role in the coffee industry during the 19th and early 20th centuries. The article illustrates the digital documentation activities and the direct and indirect research on the *Fazenda Santa Maria*, one of the few remaining historic fazendas in the São Carlos region, exploring the significance of this historic building through the survey, models, and drawings developed to identify and classify its architectural features, as well as its current state of conservation. The defined documentation strategy to gain a comprehensive knowledge of the building includes technologies such as 3D laser scanning and photogrammetry, which allow precise recording and analysis of the historic property. By capturing high-resolution data, these methods facilitate detailed documentation of architectural features and conditions, implementing the knowledge of this typology of architectural heritage while providing a robust basis for conservation efforts and information for dissemination activities.

Keywords

Fazenda Santa Maria do Monjolinho, Historical memory, Brazilian heritage, Digital representation, 3D survey.

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1. INTRODUCTION

The historic fazendas of the State of São Paulo are emblematic of Brazil's agrarian heritage, especially during the 18th and 19th centuries when coffee cultivation dominated the region. These estates played a crucial role in Brazil's economic and social fabric, significantly contributing to the development of the state of São Paulo as a leading economic centre [1, 2].

The article presents the analyses, digital survey, and documentation activities carried out on the *Fazenda Santa Maria do Monjolinho*, one of the few surviving historical examples of fazendas in São Carlos [3]. Through digital surveys and representations, the study examines

the importance of the Fazenda, categorises its architectural characteristics, and assesses the current state of conservation of the building.

The *Fazenda Santa Maria do Monjolinho*, one of the few remaining productive fazendas in the municipality of São Carlos, has been identified as a representative of the significant cultural and historical heritage linked to the colonial and post-colonial development of the country, as well as an outstanding example of built heritage of Italian origin, testifying to the legacy of the Italian migration to the State of São Paulo at the end of the 19th century. In fact, this Fazenda, as well as other his-

toric fazendas in the State of São Paulo, are not only agricultural estates; they are cultural landmarks that encapsulate the historical narrative of Brazilian agronomy, colonization, and socioeconomic development. The 19th-century coffee boom left an indelible mark on the region's landscape and economy, underscoring the fazendas' pivotal role in shaping local and national history [2] (Fig. 1).

The study adopts a multidisciplinary approach to achieve these goals, integrating historical research, architectural analysis, 3D surveying, and digital representation. The methodology employed in this research is not only aimed at documenting and conserving *Fazenda Santa Maria do Monjolinho* but also at developing a replicable operational framework for similar heritage sites.

The specific contributions of this study include:

- defining and testing a methodology for the study and conservation of such heritage assets;
- enhancing the knowledge base of *Fazenda Santa Maria* to support its preservation;
- systematizing the architectural characteristics of this type of heritage in Brazil;
- raising awareness and support for the conservation of this heritage, which is increasingly threatened by construction and development pressures.

Further, the replicability of the operative methodology adopted in the study is also discussed.

The proposed study was developed as part of the *Progetti di Rilevante Interesse Nazionale* (PRIN), titled *KNOW.it Transition in Digital Age: KNOWing our background to refine our future*. This research project stems from a growing need in the field of cultural heritage that has been increasingly unveiled in recent years by some European Community projects proposals. The *Piano Nazionale di Ripresa e Resilienza* (PNRR) and *Piano Nazionale Complementare* (PNC) have provided for investments and reforms to foster a lasting and sustainable development of the economy. In particular, the mission "Digitization, Innovation, Competitiveness and Culture" supports digital innovation as the core of transforming business production processes.

The Horizon Europe – Work Programme 2023-2024. Culture, Creativity and Inclusive Society – provides for the investment of substantial amounts of money for the digitization of cultural heritage (collections, monuments, buildings, etc.), recognizing its benefits in terms of preservation, accessibility, and support for cultural and creative innovation. These investments aim to implement access to European cultural heritage through digitised objects and spread its social value in Europe and abroad. For this reason, this project intends to find a way to recover the architectural heritage of Italian origin as a product of the culture that generated it, a task that can be difficult since this heritage is spread all over the world and, for the same reason, also little known. The project proposes a "virtual comeback" of the architectural heritage through a hypermedia collection composed of digital models realized through ICTs, fostering an original form of communication through social objects and social networks to extend knowledge to different categories of users. The project's case studies are located in the Brazilian state of São Paulo, which has numerous testimonies of architectural heritage of Italian origin. The buildings and architectural complexes identified, including the *Fazenda Santa Maria do Monjolinho*, were selected to spread knowledge of the expressive roots of the architectural lexicon of the Italian designers and workers who contributed to its construction and development.

In terms of methodology, it involved several steps: defining objectives and scope; site research; identifying techniques and tools; planning the data collection phase; defining the data processing phase; data archiving; analysis and interpretation.

Regarding the operative workflow, firstly, extensive archival research has been conducted to document the history of *Fazenda Santa Maria do Monjolinho*. This phase includes collecting historical records, maps, photographs, and personal narratives that provide a comprehensive understanding of the estate's past.

Secondly, architectural surveys have been carried out to document the physical features of the Fazenda. These surveys involve detailed measurements, drawings, and photographic records as well as photogrammetry and 3D scanning that capture the architectural essence of the es-

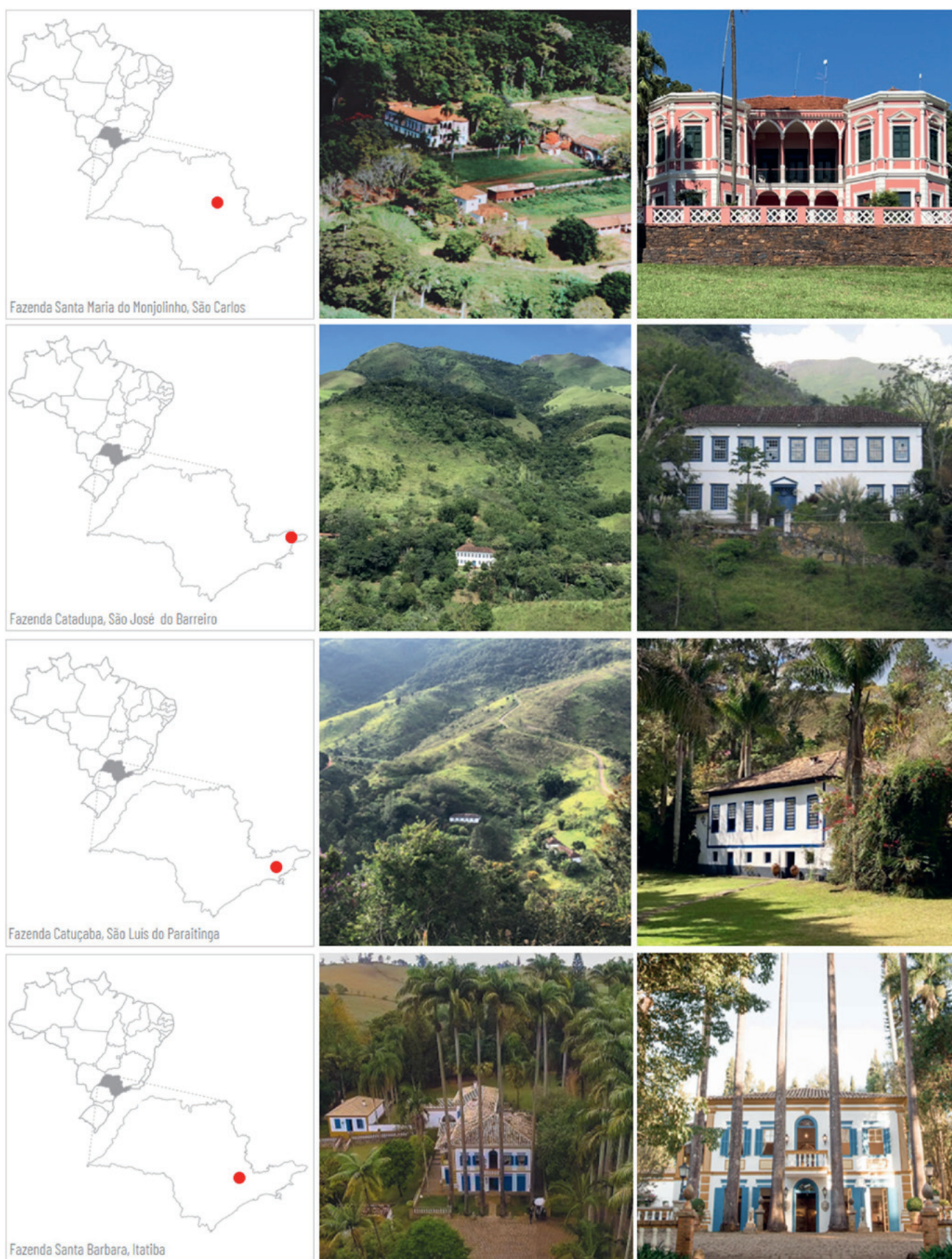


Fig. 1. Historic fazendas in the state of São Paulo. Source: Authors.

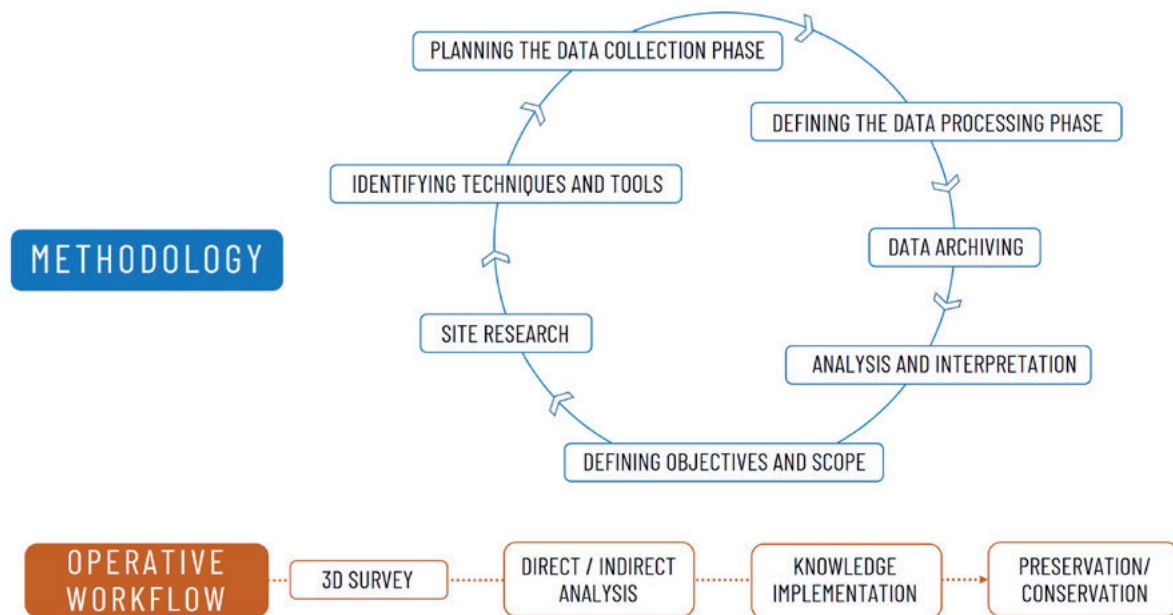


Fig. 2. Project's methodology and operative workflow. Source: Authors.

tate (Fig. 2). The digital survey was preparatory to the analysis of the structure and construction details in order to know and understand its construction history and plan its preservation accordingly.

2. THE LEGACY OF THE ITALIAN IMMIGRATION IN THE STATE OF SÃO PAULO

Italian immigration to the State of São Paulo, Brazil, represents an important chapter in the region's demographic and cultural development, beginning in the late 19th century and intensifying in the early 20th century. This migration was driven by a combination of push factors, such as economic hardship and political instability in Italy, and pull factors, such as the burgeoning coffee economy and the demand for labour in São Paulo [4]. While facing a labour shortage for its coffee plantations following the abolition of slavery in 1888, the state actively recruited Italian immigrants through subsidies and contracts that promised employment and land opportunities. Between 1870 and 1920, some 1.5 million Italians arrived in Brazil [5], with a significant number settling in São Paulo (Fig. 3).

This migrant flow not only changed the demographic landscape but also profoundly impacted the cultural fabric of the region. Italians created vibrant communities, con-

tributed to the agricultural and industrial sectors, and integrated their customs, cuisine, and traditions into the local culture. The Italian influence is particularly evident in the state's architecture.

In this context, the Italian civil engineer Pietro David Cassinelli (1854-1898) brought his construction know-how and cultural background to the State of São Paulo. He arrived in Brazil in 1882 at the age of 28 and settled in the region of São Carlos/SP, where Theodoro Leite de Camargo commissioned him to build the headquarters of the Fazenda of Santa Maria do Monjolinho [6].

Renowned architect and civil engineer, Pietro David Cassinelli was also a pioneer and collaborator in various fields of industry, commerce, urban planning, and sport, according to minutes and documents that still exist today. In 1884, he prepared a map of the city, perhaps the first of its kind in São Carlos [7]. He also worked on developing and extending the railway in the section that connects Rio Claro with Jaú, passing through São Carlos.

He owned a furniture factory, a carpentry and joinery workshop, a sawmill, and a lathe workshop, all adjacent to his residence. He also owned an ice-making industry [2].

In addition to the Fazenda de Santa Maria do Monjolinho, Cassinelli's work includes other buildings that still exist and are of great historical value to São Carlos, such as The Palace of the Count of Pinhal; the Palace of Bento Carlos;



Fig. 3. Poster and infographics illustrating the phenomenon of Italian immigration in Brazil, especially in the state of São Paulo. Source: image processing by the authors.

the building in Rua Jesuíno de Arruda, on the corner of Rua Episcopal, belonging to the Pillegi family; the building in Rua São Joaquim, on the corner with Rua Conde do Pinhal; the building in Rua Dona Alexandrina, on the corner of Rua Padre Teixeira, already demolished; the building in which he lived with his family, in Rua Jesuíno de Arruda, opposite Praça Santos Dumont, later demolished [2].

3. ARCHITECTURAL AND CULTURAL SIGNIFICANCE OF THE FAZENDA SANTA MARIA DO MONJOLINHO

The *Fazenda Santa Maria do Monjolinho* is one of the oldest coffee farms in the municipality of São Carlos (SP). It began operating around 1870 and has been dedicated to coffee growing ever since. During the late 19th and early 20th centuries, the fazenda became a significant player in the coffee industry, contributing to the region's economic prosperity. The coffee produced at *Fazenda Santa Maria do Monjolinho* was exported to various parts of the world, fostering economic ties and cultural exchanges [1].

The fazenda was established in the mid-19th century. The estate played a crucial role in transforming São Carlos into a prominent agricultural hub. The Fazenda is located on the banks of the Monjolinho River and is rec-

ognised as a Historical Heritage Site by the *Conselho de Defesa do Patrimônio Histórico, Arqueológico, Artístico e Turístico* (CONDEPHAAT) of the State of São Paulo and now by the municipality [3]. It is the result of the dismemberment of an old property called *Engenho Novo*, one of the pioneers in coffee production in the western region of the state (Fig. 4).

The first headquarters of the Fazenda were built in the 1880s by Theodoro Leite de Camargo, precisely during the peak of coffee production. The farm tells the story of Brazil's coffee wealth. The historic property built between 1887-1889 has a large *sobrado*, a farmyard, a threshing floor, an aqueduct that powered the water wheel that marked the coffee cycle, a slave quarters, a captain's house, and a chapel (Fig. 5).

Fazenda Santa Maria is a landmark in history for representing and preserving, in the national context, the wealth generated by the coffee cycle, being one of the few estates in the country that has managed to overcome crises by preserving its land since it was cleared in 1850. To this day, its owners have kept the same amount of land and its buildings intact. The relevance of the Fazenda relies on its role in the Brazilian coffee economy of the first decades of the 20th century. This role is attested to by the survey ordered by the Brazilian government

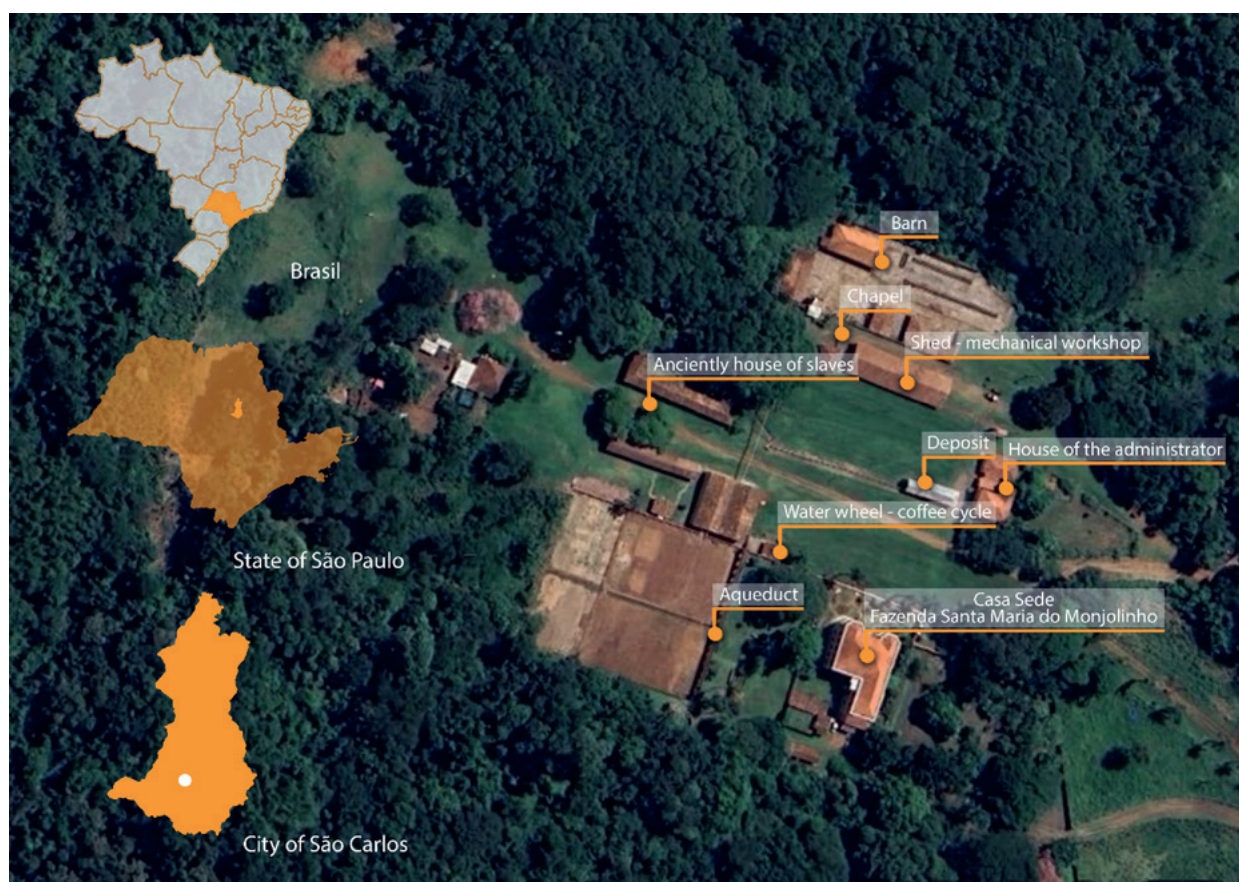


Fig. 4. Territorial framework of the Fazenda Santa Maria do Monjolinho. Source: Authors.



Fig. 5. Photographic framework of the Fazenda Santa Maria do Monjolinho. Source: Authors.

under the presidency of Marshal Hermes da Fonseca in 1913 [3]. The Government of the United States of Brazil instructed Lloyds Bank to conduct such a survey through its subsidiary Lloyds Publishing Company [1].

The *Grande Sobrado* was built with great sophistication, using cement and frescoes.

The farmyard, the threshing floor, the coffee processing machine, the impressive aqueduct that powered the water wheel, the slave quarters, the house of the captain of the bush, and the old railway station mark the history of slaves, immigrants, and farmers.

With the decline of the coffee industry in the mid-20th century, the Fazenda faced economic challenges, leading to changes in ownership and the eventual repurposing of its land. *Fazenda Santa Maria do Monjolinho* has retained much of its historical architecture and cultural heritage despite these transformations.

The architectural layout of *Fazenda Santa Maria do Monjolinho* vividly represents the colonial style that prevailed at the time of its construction. The grand manor house is at the heart of the estate, designed in a neoclassical style. Its expansive verandas, high ceilings, and ornate details symbolize the original owners' wealth and social status. Surrounding the main house are several outbuild-

ings, including former slave quarters, barns, and coffee processing facilities, which provide valuable insight into the day-to-day operations of the estate and its role in agricultural production. In addition to its historic charm, the Fazenda's grounds feature meticulously planned gardens and walkways that reflect the aesthetic ideals of the period and enhance the overall ambiance of the site. This blend of architecture and landscape allows visitors to step back in time and experience the historical significance of the estate.

Fazenda Santa Maria do Monjolinho is a cultural landmark that embodies the traditions, labour practices, and social hierarchies of 19th-century Brazil. The estate serves as a historical repository, preserving the stories of the people who lived and worked there, including the enslaved Africans who played a crucial role in its operation.

These considerations seek recognition from memory preservation bodies in the preservation organizations in São Paulo's architecture, in this case, showing the relevance of the adopted building solutions and the proximity between the Italian architectural lexicon and the rural bourgeois residential architecture of a coffee plantation.

The study within the *Fazenda Santa Maria do Monjolinho* complex focused on the main residential building, the so-called *Casa Sede* (Fig. 6).



Fig. 6. The Casa Sede within Fazenda Santa Maria. Source: Authors.

The building, completed in 1889, had 36 rooms and a surface area of 800 square meters (Fig. 7) [2]. In terms of materials, the house was built with stone and bricks. Its space reflects the historical context of the transition from

the Empire to the Republic [8, 9], demonstrating modernity in its eclectic design and construction techniques. It is one of the most important examples of rural housing produced in the region at the end of the 19th century [10].

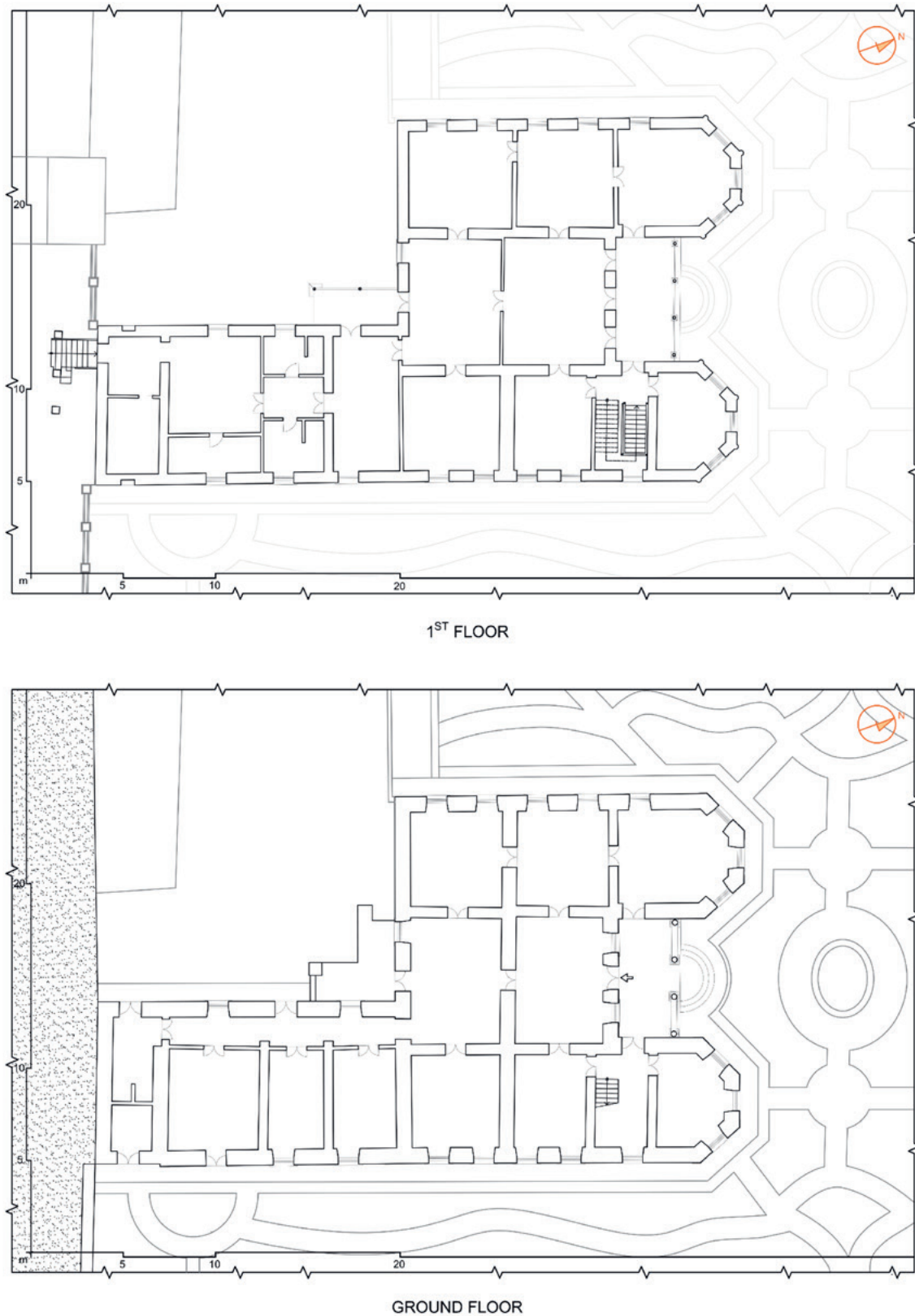


Fig. 7. Floor plans of the Casa Sede. Elaborated by authors from the 1998 survey documents provided by the owners of the Casa Sede.

4. DIGITAL DOCUMENTATION PROCESS

The digital documentation activity involved digital photography, 3D scanning, and digital archiving.

Digital photography was undertaken to gain a comprehensive knowledge of the house. All photographs were taken using a Canon EOS600D digital camera.

Laser scanning techniques were used for the digital documentation of the *Casa Sede* to obtain a higher level

of detail of the house in a short time. A Faro Laser Scanner Focus3D was used to collect the data (Fig. 8).

The information from the laser scanning was processed in Autodesk Recap, where all the scans were combined. Once all the data had been processed, the consolidated coloured point cloud models were used to generate orthophotos. These are the graphical basis for the 2D drawings (Fig. 9) required for condition assessment and analysis of character-defining elements.



Fig. 8. Laser scanning process. Source: Authors.



Fig. 9. 2D Drawings of the façades of the Casa Sede generated from the 3D survey. Source: Authors.

5. TYPOLOGICAL AND MATERIAL ANALYSIS

Key aspects of the typological analysis of the *sobrado* within the *Fazenda Santa Maria do Monjolinho* include:

- architecture: the main house typically reflects colonial architectural styles with a combination of Genoese neoclassical and gothic elements. The structure is L-shaped and inscribed in a rectangle of size 35 m x 20 m;
- function: the *Casa Sede* served as the residence of the plantation owner and their family. It was the administrative and social centre of the *Fazenda*;
- design elements: large and high loggia, high ceilings, and expansive windows for ventilation and lighting. The interior is divided into various rooms, including living areas, dining rooms, and bedrooms, all designed for comfort and status display.

Building materials mainly included stone and brick, which were used for the foundations and walls of the main house. These materials were often locally sourced [10].

Clay tiles were used for roofing, providing good insulation against the tropical climate. Lime plaster was instead adopted for wall finishes and previously painted in light colours. Concerning flooring and interior finishes, the house features tiled and wooden floors. The house's interiors were elaborately finished, with plastered walls, wooden panelling, and decorative elements (Fig. 10).

The structural type that characterizes the building is load-bearing masonry with horizontal wooden slabs covered by wood ceilings with various geometries and decorations. An image of the decorated ceiling placed in one of the main floor halls is given as an example (Fig. 10).

The loggia, which covers both the ground floor and the first floor and thus spans the entire front height, was built on the entrance façade.

The loggia consists of four columns on the ground floor that extend over four others on the first floor.

Both the basement and capitals are differentiated by floor. On the ground floor, there is a lower basement with a square cross-section, while on the first floor, the square cross-section is developed up to the height of the parapet. As for the capitals, those on the ground floor can be compared to an eclecticism inspired by the Doric order, supporting slightly lowered arches. The first floor has

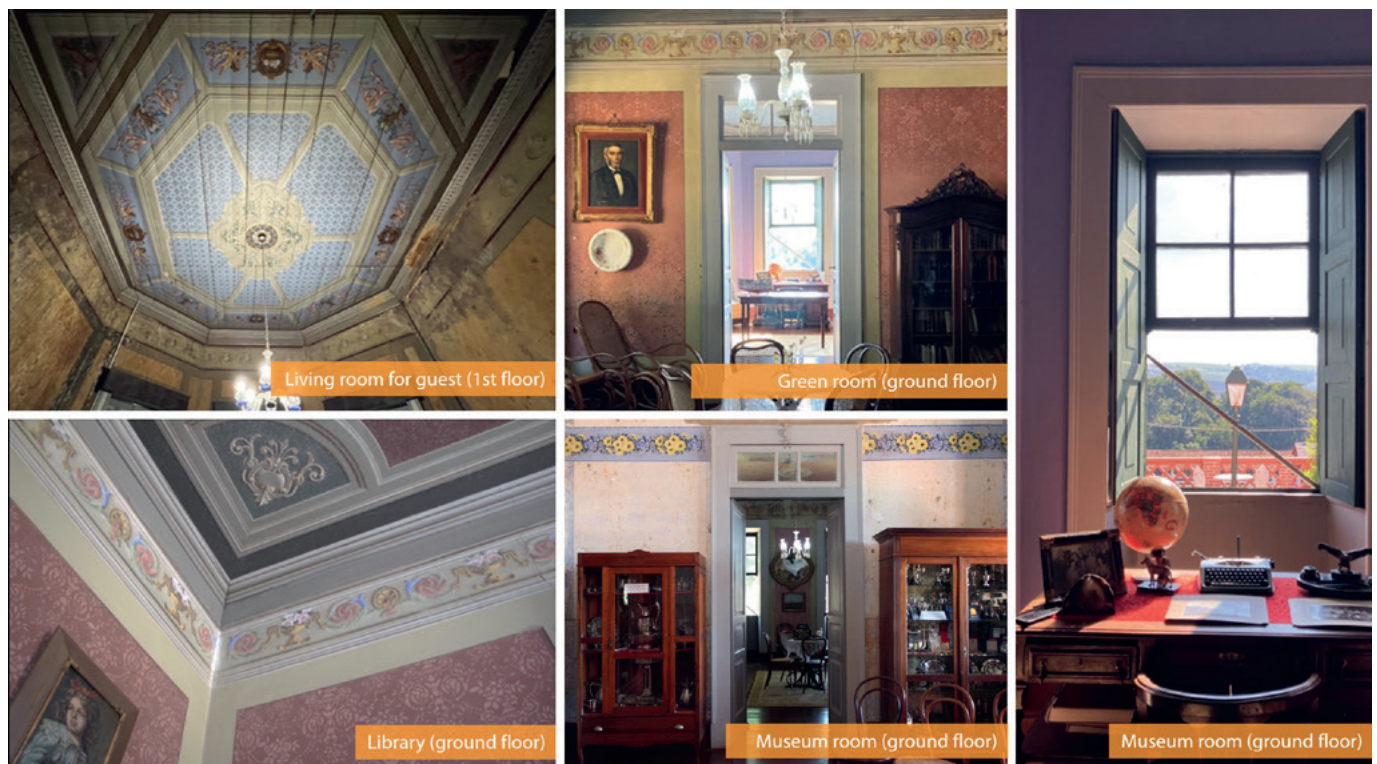


Fig. 10. Indoors environments of the Casa Sede. Source: Authors.

cup-shaped capitals with raised leaf designs supporting pointed arches. Specifically, the perimeter walls of the lower floor are 85 cm thick, while those of the upper floor are 60 cm thick. The interior walls also vary in thickness.

The roof is of the hipped type with several pitches, formed by a wooden structure of trusses, transoms, and beams to support the roof covering made of *telha francesa* type tiles.

The developed typological and material analysis of the *Casa Sede* in the *Fazenda Santa Maria do Monjolinho* provides a comprehensive understanding of its architectural significance and the socioeconomic context of the time. The house design and construction reflect the cultural values, economic practices, and technological capabilities of 19th-century Brazil, making it a valuable site for historical and cultural studies [11, 12].

6. RESULTS

The 3D surveys conducted provided a robust foundation for analysing the historic structure of *Fazenda Santa Maria do Monjolinho*, enhancing understanding of its construction techniques, building materials, and character-defining elements. Additionally, digital documentation improved the geometric understanding of the complex, which has undergone many transformations over time. The key results of the analysis are multifaceted, reflecting a deep dive into the architectural, cultural, and historical significance of this estate.

The study has substantially enhanced knowledge about the construction techniques and materials used in the estate. By meticulously documenting the building methods, the research offers valuable insights into the technological solutions adopted during the period. This understanding is critical as such historical structures are increasingly threatened by pressures from modern economic development. The estate's use of brick masonry, timber framing, and lime plaster for wall finishes reveals a cultured construction approach that balances durability with environmental adaptation.

In addition, the research systematically identified and catalogued the main architectural, structural, constructional, and decorative elements characteristic of this architectural type. This systematic approach not only aids

in preserving the architectural identity and authenticity of the estate but also serves as a critical resource for conservation efforts. The detailed analysis of elements such as the large verandas, high ceilings, expansive windows, and the interior finishes, including plastered walls, wooden panelling, and decorative features, provides a comprehensive understanding of the estate's aesthetic and functional attributes. These findings are crucial for developing accurate restoration and preservation plans that respect the original design and craftsmanship.

The study also highlights the significant influence of Italian immigration on Brazilian culture, particularly in the Architecture, Engineering, and Construction (AEC) sector. The contributions of Pietro David Cassinelli, an Italian civil engineer instrumental in the construction of the *Fazenda*, exemplify this cultural exchange. Cassinelli's work reflects the blend of Italian engineering prowess with local Brazilian building traditions, resulting in a unique architectural synthesis that characterizes the studied *Fazenda*. This cross-cultural influence is not merely a historical footnote but a testament to the dynamic cultural and technical exchanges that have shaped Brazil's architectural heritage.

7. CONCLUSIONS AND FURTHER IMPLEMENTATIONS

Fazenda Santa Maria do Monjolinho stands as a vital cultural and historical asset that encapsulates the rich heritage of São Carlos and Brazil's coffee era.

The comprehensive documentation and conservation efforts outlined in this study underscore the estate's significance and the urgent need for its preservation for future generations. The conclusions drawn from this research, which tie in with a broader one concerning the legacy of architectural culture in Brazil, are not only about understanding the past but also about future actions to safeguard this heritage.

One of the primary conclusions is the necessity of fostering community involvement in preservation efforts. Engaging the local community is crucial for creating a sense of ownership and pride in the local heritage. Community involvement can take many forms, from educational programs in local schools to participatory con-

ervation projects where residents can contribute to the upkeep and restoration of the estate. This engagement ensures that the heritage site is not seen as a static relic but as a living part of the community's cultural landscape. Sustainable tourism not only provides a steady revenue stream for maintenance and preservation but also educates visitors about the importance of heritage conservation.

Leveraging modern technology is another crucial recommendation from the study. Utilizing digital tools such as 3D models and hypermedia collections can significantly aid in the knowledge, preservation, and promotion of the tangible and intangible heritage associated with historic buildings such as the Fazenda Santa Maria. These technologies enable a "virtual comeback", providing an innovative form of communication and accessibility. Digital models can serve as detailed records of the current state of the estate, which are useful for future informative actions.

Understanding the Italian heritage in Brazil is of paramount importance. The study of *Fazenda Santa Maria do Monjolinho* not only highlights the architectural and cultural significance of the estate but also underscores the deep impact of Italian immigration on Brazilian society [13, 14]. This research demonstrates one of the many contributions of Italian immigrants, particularly in the fields of architecture, engineering, and construction, which has left a lasting legacy on the Brazilian cultural landscape. More specifically, the involvement of Italian civil engineer Pietro David Cassinelli in the estate's construction exemplifies the fusion of Italian craftsmanship with local traditions, resulting in a unique architectural synthesis that enriches Brazil's heritage. The exploration of Italian heritage within Brazil provides a broader understanding of the cultural exchanges that have shaped the nation's history. Recognizing and documenting these influences is essential for appreciating the multicultural dimensions of Brazilian identity. This study contributes to this understanding by meticulously documenting the Italian architectural and engineering techniques integrated into the estate. Such recognition not only honours the contributions of Italian immigrants but also fosters a deeper appreciation for the diverse cultural influences that have shaped Brazil.

Furthermore, this article serves as a critical resource for scholars, historians, and conservationists interested in the preservation of Italian heritage in Brazil. By providing a detailed analysis of the estate's construction techniques, materials, and cultural significance, the research offers a model for similar studies on other heritage sites. The insights gained from this study can inform conservation strategies and policies aimed at preserving the architectural and cultural heritage of Italian origin in Brazil and beyond.

This study represents an initial achievement of the PRIN PNRR 2022 research project, *KNOW.it Transition in Digital Age: KNOWing our background to refine our future* which started in November 2023. As part of the project, a detailed Excel file was created to classify all elements in Italian-origin architecture. This classification tool represents a fundamental step towards the creation of a web platform aimed at disseminating knowledge of Italian architectural heritage in Brazil. The platform will facilitate the documentation and preservation of heritage sites and serve as an educational resource for scholars, students, and history enthusiasts. By utilizing digital technologies, the platform will allow global accessibility, promoting broader appreciation and awareness of the shared cultural heritage between Italy and Brazil.

Future implementations of this project will focus on enhancing the visibility and appreciation of such heritage sites through various digital and community-oriented initiatives. The documentation and conservation strategies developed in this study not only aim to preserve *Fazenda Santa Maria do Monjolinho*. The project sets a precedent for preserving and promoting cultural heritage in Brazil and beyond by integrating historical research, architectural analysis, and modern technology. This holistic approach ensures that the preservation efforts are not only about maintaining the physical structure but also about keeping the cultural and historical narratives alive for future generations. In conclusion, the research on *Fazenda Santa Maria do Monjolinho* emphasizes the importance of understanding and preserving the Italian heritage in Brazil. By highlighting the architectural, cultural, and historical significance of this estate, this study provides a comprehensive framework for future conservation efforts. The insights gained from this research

contribute to a deeper appreciation of the multicultural dimensions of Brazilian identity and underscore the value of cross-cultural exchanges in shaping the nation's heritage.

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