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# DOCUMENTING REPUBLICAN ARCHITECTURE IN AREQUIPA. SPATIAL, CONSTRUCTIVE, AND STYLISTIC ASSESSMENT OF THREE EMBLEMATIC "CASONAS"

## DOCUMENTANDO LA ARQUITECTURA REPUBLICANA DE AREQUIPA. VALORACIÓN ESPACIAL, CONSTRUCTIVA Y ESTILÍSTICA DE TRES CASONAS EMBLEMATICAS

## DOCUMENTANDO A ARQUITETURA REPUBLICANA EM AREQUIPA. AVALIAÇÃO ESPACIAL, CONSTRUTIVA E ESTILÍSTICA DE TRÊS "CASONAS" EMBLEMÁTICAS

**Figure 0.** Photographic inventory obtained Alianza Francesa. Source: Preparation by the authors.

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## RESUMEN

Más del 50% de las edificaciones que conforman la zona monumental de Arequipa, Perú, pertenecen al período republicano. Cerca de 500 edificios, en su mayoría de arquitectura doméstica -por lo que reciben el nombre genérico de "casonas", presentan fachadas que pueden ser catalogadas dentro de los estilos neoclásico, neorrenacentista, ecléctico, neogótico, art decó y art Nouveau. De éstos, 240 cuentan con declaración como Patrimonio Cultural, lo que deja cerca del 50% de edificios desprotegidos y por tanto expuestos a mayores riesgos de ser abandonados, deteriorados o alterados con intervenciones que afecten su fábrica original. Ante esta realidad, la presente investigación busca interpretar los procesos de evolución espacial, constructiva y estilística de edificaciones significativas de este período, como aporte a su conocimiento y preservación. La investigación aplicó una metodología para clasificar, seleccionar, evaluar y analizar las principales características de tres casonas que actualmente albergan las instituciones Alianza Francesa de Arequipa, Centro de la Artes de la Universidad Católica San Pablo y Colegio de Arquitectos del Perú Regional Arequipa, todas ellas muestras significativas de arquitectura del período republicano que han adaptado sus espacios a nuevos usos. Estas casonas fueron seleccionadas a partir de la calificación de una muestra mayor. Del análisis realizado se desprendieron resultados que evidencian aspectos como el porcentaje de conservación de la fábrica original de los edificios, que en todos los casos es superior al 50%, o la proporción de espacio abierto, que en algunos casos se ha visto reducido hasta ocupar el 20% del lote. A nivel constructivo, se destaca la preservación de estructuras de sillería de ignimbrita con muros de cajón, cubiertas con bóvedas de cañón en dos de los casos estudiados y cubiertas planas con rieles de hierro en uno de ellos, contabilizándose adiciones estructurales con materiales contemporáneos de hasta un 30%. Respecto a las cualidades estilísticas, se han identificado los principales rasgos compositivos que les asignan un valor de estilo, siendo el lenguaje neoclásico el predominante.

**Palabras clave:** patrimonio, evolución espacial, evolución constructiva, estilo arquitectónico, fotogrametría

## ABSTRACT

More than 50% of the buildings in the monumental area of Arequipa are from the Republican period. Close to 500 buildings, primarily domestic architecture -hence they are commonly referred to as "casonas" (big houses)- have facades that can be classified within the neoclassical, neo-Renaissance, eclectic, neo-Gothic, Art Deco, and Art Nouveau styles. Of these, 240 have been declared as Cultural Heritage. Given this reality, this research seeks to interpret the spatial, constructive, and stylistic evolution processes of significant buildings from this period to contribute to their understanding and preservation. The research has applied a methodology to classify, select, evaluate, and analyze the main characteristics of three "casonas" that currently house the Alliance Française of Arequipa, Center for the Arts of the Catholic University San Pablo, and the Arequipa Regional College of Architects of Peru, all of them significant examples of Republican period architecture that have adapted their spaces to new uses, and which were chosen based on the qualification of a larger sample. The analysis results show aspects such as the preservation percentage of the building's original fabric, above 50% in all cases, and the proportion of open space. At a constructive level, the preservation of ignimbrite ashlar structures with box walls stands out, covered with barrel vaults in two of the cases studied, and flat roofs with iron rails in one of them, with structural additions where contemporary materials comprise up to 30%. Regarding stylistic qualities, the main compositional features that assign them a stylistic value have been identified, with neoclassical language predominating.

**Keywords:** heritage, spatial evolution, constructive evolution, architectural style, photogrammetry

## RESUMO

Mais de 50% dos edifícios que compõem a área monumental de Arequipa, Peru, pertencem ao período republicano. Cerca de 500 edifícios, em sua maioria de arquitetura doméstica - razão pela qual recebem o nome genérico de "casonas" - possuem fachadas que podem ser catalogadas dentro dos estilos neoclássico, neorrenascentista, eclético, neogótico, art déco e art nouveau. Desses, 240 foram tombados como Patrimônio Cultural, o que deixa cerca de 50% dos edifícios desprotegidos e, portanto, expostos a maiores riscos de serem abandonados, deteriorados ou alterados com intervenções que afetem seu tecido original. Diante dessa realidade, a presente pesquisa busca interpretar os processos de evolução espacial, construtiva e estilística de edifícios significativos desse período, como uma contribuição para seu conhecimento e preservação. A pesquisa aplicou uma metodologia para classificar, selecionar, avaliar e analisar as principais características de três grandes casarões que atualmente abrigam as instituições Alianza Francesa de Arequipa, Centro de la Artes de la Universidad Católica San Pablo e Colegio de Arquitectos del Perú Regional Arequipa, todos eles exemplos significativos da arquitetura do período republicano que adaptaram seus espaços a novos usos. Estas mansões foram selecionadas com base na qualificação de uma amostra maior. A partir da análise realizada, foram obtidos resultados que mostram aspectos como o percentual de conservação do tecido original dos edifícios, que em todos os casos é superior a 50%, ou a proporção de espaço aberto, que em alguns casos foi reduzida até ocupar 20% do lote. Em termos de construção, a preservação das estruturas de cantaria de ignimbrito com paredes de caixa, telhados em abóbada de berço em dois dos casos estudados e coberturas planas com trilhos de ferro em um deles, sendo que os acréscimos estruturais com materiais contemporâneos representam até 30%. Com relação às qualidades estilísticas, foram identificadas as principais características compositivas que lhes atribuem valor estilístico, sendo a linguagem neoclássica a predominante.

**Palavras-chave:** patrimônio, evolução espacial, evolução construtiva, estilo arquitetônico, fotogrametria

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## INTRODUCTION

In the historic urban center of Arequipa, Peru, specifically the foundational checkerboard, 5.93% of buildings are from the Viceregal period, 48.53% from the Republican period (19th and early 20th centuries), 20.84% from the modern period, and 24.70%, the contemporary period (Arequipa Municipal Planning Institute [IMPLA], 2017). This means that about half of the buildings in the monumental area are from the Republican period. However, they have retained the unity of an urban ensemble, where certain values were recognized, meriting the Historic Center of Arequipa's declaration in 2000 as a Cultural Heritage of Humanity by the United Nations Educational, Scientific, and Cultural Organization [UNESCO].

The need to understand Historical Centers from their integrality, expanding the view on cultural heritage, implies no longer restricting the conservation of heritage to the preservation of certain monuments but instead including the different ensembles of properties that, regardless of their origin, era or architecture, are representative of the memory of increasingly culturally diverse societies. It is also essential to understand Historical Centers not as a static and immovable entity but as an integral part of growing cities, with the same dynamics and potentialities in the social, economic, cultural, and/or environmental aspects as any other part of them. In this, the buildings of protected areas play an important role in how they can be adapted to new uses under social changes, without this meaning that their heritage status is lost, determined by the prevalence of specific values of memory or identity.

This article seeks to direct the gaze toward specific architectural facts of Arequipa's central area. The buildings from the Republican period represent a relevant proportion of the urban complex since there are approximately 500 buildings, mostly of domestic architecture, with a predominance of neoclassical, neo-Renaissance, eclectic, neo-Gothic, Art Deco and Art Nouveau architectural styles, which are generically called "***casonas"*** or mansions. Of these, less than 240 have been declared cultural heritage, and another 187 have been proposed to be declared as such (IMPLA, 2017). The buildings that are not declared as monuments are exposed to being abandoned by interventions that partially or entirely alter their conformation or, in the worst case, are at risk of destruction, either due to seismic causes or intentionally due to the commercial pressure on the urban area in which they are located.

Protecting and safeguarding heritage as the foundation of society's identity requires adequate knowledge as a precondition. In Peru, the responsibility for disseminating the values that attach

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importance to heritage initially lies with the Ministry of Culture, a Central Government entity whose roles expressly include "[...] carrying out actions for the conservation and protection of cultural heritage [...], and promoting the strengthening of citizenship and cultural identity [...]" (Ministry of Culture [MINCUL], n.d.). Other international specialized agencies such as UNESCO and ICOMOS have also been involved in protecting cities' material heritage without neglecting the role of local governments. However, the citizens themselves are called to actively participate in the initiatives to disseminate the identity values of their monuments. Local actors, individually or as organized groups, can intervene in managing heritage from the opinion, mobilization, dissemination, awareness, and fundamentally, the use and benefit of cultural property.

That is why this research contributes to recognizing the values of certain architectural expressions of the past of Arequipa, understanding that it is necessary to understand what you want to preserve. This article outlines the methodology used to select three buildings of the Historical Center of Arequipa, to carry out a review of architectural elements that complement the existing documentation, and to carry out an analysis of spatial, constructive, and stylistic values, which point to the documentation and knowledge that allows including the buildings of the Republican period of Arequipa's monumental area to the city's body of the intangible cultural heritage, to the same degree as the exponents of the architecture of other historical periods.

The methodology for documenting the architecture analyzed is primarily based on using photogrammetry as a collection method. This method explores the advantages and possibilities for documenting real estate heritage. Its speed and accuracy were tested, which were very useful for reviewing facades.

## STATE-OF-THE-ART

The use of digital photogrammetric techniques has become widespread over the last decade in diverse civil and academic fields. In the case of architecture in general and the preservation of real estate heritage in particular, the current use of the technique allows surveys to be carried out quickly and accurately using the multi-image system, becoming an extremely useful tool for heritage conservation work. Photogrammetry is based on the principle that it is possible to recreate the shape and dimensions of an object using its photographs, i.e., that a photograph can provide analytical data over a simple description. Simply, if a photograph is a conical perspective of an object generated from a certain point of view, the reverse allows one to deduce the shape of said object from the corresponding photograph (Natividad Vivó & Calvo López, 2010).

To do this, it is necessary to identify the coordinates of a point in two or more photographs of a particular object and superimpose them. Although the technique has been used since 1858 to survey architectural works, analog photogrammetry was not used on a large scale as it required complex methods to establish correlations between different photographs and mathematical algorithms to reconstruct the shape of buildings. The advent of digital cameras and computer development simplified the procedure. At the start of the century, researchers were already talking about the possibilities the mechanism had with the level of technological development of the time (Almagro, 2000). However, the problem of the high cost of the equipment needed for data processing persisted for some time. Nowadays, the improvement and use of specialized software allow surveys to be carried out with exceptional graphic quality and high precision at low cost, and with the additional advantage of enabling early detection of errors in the model and their simple correction (Moyano, 2017).

In the case of the research in this article, digital photogrammetry is proposed to facilitate the survey and analysis of architecture that is part of the cultural heritage of the Republican period buildings in Arequipa, thereby contributing to their preservation. The research is not directed towards the city's main monuments of civil and religious architecture, but to those that until now have been relegated as an object of academic rigor and that are included within a broader concept of heritage, demanding a particular response to face the risk of deterioration to which they are exposed (Almagro, 2000). Several research studies have used photogrammetry as a tool for heritage conservation, from the urban analysis of historical centers supported by aerial photogrammetry (Picon-Cabrera et al., 2021) to reconstructions of architectural elements that, due to their level of complexity, would be unfeasible to build traditionally, such as the reproduction of each of the stonework pieces of a vault edge comprising whole pieces (Natividad-Vivó & Calvo-López, 2010), through the survey of the state of conservation of walls in industrial heritage (Villar, 2018), or proposals for the mapping of pathologies in heritage elements (Sánchez López, 2021).

In the case of Arequipa, photogrammetry, as an instrument for preserving heritage, has been used in the civil sphere by surveying several buildings. However, few scientific research studies have been made. The case of virtualization of the archaeological site of Toro Muerto can be cited (Gonzales Ruiz et al., 2020) or the long-awaited project to reconstruct the face of the "mummy" Juanita using digital photogrammetric techniques by researcher Andrew Wilson, announced in 2018 by the Andean Sanctuaries Museum of the Santa María Catholic University. As for the

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architectural heritage of Arequipa, it awaits the opportunity to be studied using this technique.

This research seeks to approach this heritage considering the current conservation paradigms, which highlight the transcendental relationship between heritage and identity, reforming the ideas of heritage protection of the 20th century. After the end of the Second World War in 1946, UNESCO emerged as an entity that would protect cultural property as part of its mission. That framework saw the terms "cultural asset" or "cultural heritage" begin to be used. In addition, the drafting in 1964 of the International Charter for the Conservation and Restoration of Monuments and Sites, known as the Venice Charter, which gave rise to the principles of monument preservation that would be taken into account from then on, is a noteworthy event. Today, however, it is clear that, as Arévalo summed up well (2004, p.931), cultural heritage must be protected "[...] not so much for its aesthetic and ancient values, as for what it means and represents."

These notions are relevant to the case of Arequipa. This city has a rich, immovable cultural heritage, mainly constituted by its architectural urban ensemble originating in the 16th and 17th centuries but also integrated by the architecture of later periods, which nevertheless follow the line of Western tradition. This monumental heritage led in 2000 to the Historic Center being recognized by UNESCO as a Cultural Heritage of Humanity, among other considerations on composing an "[...] exceptional example of colonial settlement, challenged by natural conditions, indigenous influences, the process of conquest and evangelization, as well as the spectacular nature of its surroundings" (UNESCO, 2000).

The cyclical occurrence of seismic movements has meant that the historic center has been subjected to continuous reconstruction processes, whereby the pre-eminence of architectural styles has been modified. This is especially noticeable after the earthquake of 1784, after which neoclassicism would begin to impose itself (Zúñiga Alfaro, 2015), and that of 1868, from which the neoclassical was consolidated, with the neo-Renaissance appearing a few years later.

Thus, most of the buildings in the city's central area belong to this historical period, exhibiting mainly the neoclassical style but also other styles that followed later in the city (neo-Renaissance, eclectic, neo-Gothic, art deco, art nouveau) during the 19th and the first half of the 20th century, until the advent of modern architecture, which makes its appearance in Arequipa after the

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earthquakes of 1958 and 1960. Moreover, they are essentially typologies of domestic architecture, which demand attention that has not been given to them so far, making clear the difference between the knowledge one has of them versus those of religious typology and the Viceregal period.

Despite the importance of these buildings as part of Arequipa heritage, the study of their architectural styles has been limited compared to their less numerous peers of the Viceregal period (the most outstanding exception being the Goyeneche house, restored by the Central Reserve Bank of Peru in 1970). This research addresses this issue comprehensively, analyzing the spatial, constructive, and stylistic evolution of Republican period buildings between 1821 and the first decades of the 20th century to conserve the city's cultural heritage.

# METHODOLOGY

## MATERIALS

The research methodology proposed a preliminary evaluation of buildings to determine how many and which ones would be considered in the study. Then, the selected buildings were diagnosed and cataloged according to their architectural style and construction period. Fieldwork surveyed the facades of the buildings with photographs using a Canon EOS Rebel SL3 camera with an EF-S 18-55mm IS STM lens. Work was then done to survey the buildings' facades and floors with the specialized 2D ***Autodesk AutoCAD*** software in its 2023 version (English) and 3D ***Agisoft Metashape Pro***. With the 2D and 3D data, spatial analysis of the buildings was made, and their stylistic character and constructive conditions were analyzed. Evaluation forms were then prepared considering their main spatial, constructive, and stylistic qualities to design and apply a comparative matrix between the buildings to recognize patterns, coincidences, dominant elements, and architectural value by their originality. Conclusions and final reflections were drawn from the data obtained.

### *Cataloguing and selection of case studies*

To pre-select the buildings, residential civil buildings were considered whose outside facades were from the Republican era, from 1821 to the first decades of the 20th century, for those in an adequate state of conservation and with public use. Their spatial, constructive, and stylistic characteristics were also considered.

The cataloging and diagnosis of the pre-selected buildings consisted of applying a standard form where the following scoring criteria were established:

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**Physical characteristics of the building:** Comprising the identification of stylistic elements (entrances, tympanums, anagrams, cornices, entablatures, friezes, triglyphs, metopes, capitals, astragalus, pilasters, basements, pedestals, baseboards, corbels, keystones, cushions, listels, straight lintels, curved lintels, epigraphs, balustrades, balconies, etc.), spatial elements (hallways, courtyards, covered galleries, exterior staircases, etc.) and constructive elements (vaulted ceilings, plate roofs, concrete roofs, etc.) they have.

**Use/Disuse:** This refers to how the evaluated buildings are currently used.

Structural features: These evaluate the structural conditions of the infrastructure in terms of the type of structure used and its current state.

**State of conservation:** This measures the level of conservation of the building facilities and is divided into indoor and outdoor upkeep.

**Living conditions index:** This considers the variables related to building comfort, social impact, safety and use, and the availability of public spaces.

**Academic criteria:** These consider the following values: artistic (aesthetic), instrumental (functionality), and historical (historical relevance).

After quantifying the results for each criterion, a total was calculated, scoring them from 0 to 100. The buildings chosen had more than 70 points.

***The shortlisted buildings were as follows:***

- La Merced 112 corner with Palacio Viejo, today, a banking agency
- La Merced 110, today, Museo Santuarios Andinos UCSM
- Consuelo 116, today, Hotel Casona del Solar
- Palacio Viejo 414, today, UCSP Arts Center
- Santa Catalina 210, corner with Ugarte, today, commercial and restaurant premises
- Santa Catalina 208, today, Alianza Francesa of Arequipa
- Santa Catalina 306 (private house)
- Santa Catalina 410, corner of Puente Grau, today, Caritas Diocesana Arequipa
- Bolívar 204, the former home of the newspaper, Correo
- Bolívar 207, today, the Arequipa Regional Office for the College of Architects of Perú
- Ugarte 207, the German Peruvian Cultural Institute
- Zela 216, today, commercial and restaurant premises

It should be noted that all the buildings measured have undergone varying degrees of alterations, maintaining, however, specific original characteristics, a criterion that has affected the assigned rating (Table 1).

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| | Building | A. Physical | | | B. Use/ des. | C. Str. Feat | D. State of conserv. | | E. Living conditions index | | | | F. Academic criteria | | | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Stylistic elements | Spatial elements | Constructive elements | | | External upkeep | Internal upkeep | Comfort of the building | Social impact | Security and use | Availability of public space | Artistic values | Instrumental value | Historical values | |
| | | 15 | 15 | 15 | 7 | 5 | 4 | 4 | 5 | 5 | 5 | 5 | 5 | 5 | 5 | 100 |
| 1 | La Merced 112 | 8 | 10 | 10 | 5 | 3 | 3 | 2 | 4 | 2 | 4 | 3 | 4 | 4 | 2 | 64 |
| 2 | La Merced 110 | 8 | 10 | 10 | 7 | 3 | 3 | 3 | 3 | 5 | 4 | 3 | 4 | 5 | 2 | 70 |
| 3 | Consuelo 116 | 8 | 10 | 10 | 5 | 3 | 3 | 2 | 4 | 3 | 3 | 3 | 4 | 4 | 2 | 64 |
| 4 | Palacio Viejo 414 | 10 | 10 | 12 | 7 | 3 | 3 | 3 | 4 | 5 | 4 | 3 | 4 | 5 | 2 | 75 |
| 5 | Santa Catalina 210 | 10 | 10 | 10 | 5 | 3 | 3 | 3 | 4 | 3 | 5 | 3 | 4 | 4 | 2 | 69 |
| 6 | Santa Catalina 208 | 12 | 10 | 12 | 7 | 3 | 3 | 3 | 4 | 5 | 5 | 3 | 4 | 5 | 2 | 78 |
| 7 | Santa Catalina 306 | 8 | 10 | 10 | 7 | 3 | 2 | 2 | 3 | 2 | 4 | 1 | 4 | 2 | 2 | 60 |
| 8 | Santa Catalina 410 | 10 | 10 | 10 | 5 | 2 | 2 | 2 | 3 | 4 | 3 | 3 | 4 | 5 | 2 | 65 |
| 9 | Bolívar 204 | 8 | 10 | 10 | 5 | 2 | 2 | 2 | 3 | 3 | 3 | 3 | 4 | 3 | 2 | 60 |
| 10 | Bolívar 207 | 8 | 10 | 12 | 6 | 3 | 3 | 3 | 4 | 5 | 4 | 3 | 4 | 4 | 2 | 71 |
| 11 | Ugarte 207 | 8 | 10 | 10 | 7 | 3 | 3 | 3 | 4 | 4 | 4 | 3 | 4 | 4 | 2 | 69 |
| 12 | Zela 216 | 8 | 10 | 10 | 5 | 2 | 3 | 2 | 3 | 3 | 4 | 3 | 4 | 4 | 2 | 63 |

**Table 1.** Standard sheet with the selection criteria. Source: Preparation by the authors

After the first diagnosis, it was determined that three buildings achieved a score above 70. Thus, the following case studies were chosen:

a. **Case study 1:** Santa Catalina 208 / Alianza Francesa de Arequipa, with a score of 78
b. **Case study 2:** Palacio Viejo 414 / UCSP Arts Center with a score of 75
c. **Case study 3:** Bolívar 207 / Arequipa Regional Office – College of Architects of Perú, with a score of 71

### *2D and 3D survey of case studies*

Field visits were conducted to the case studies on July 28th, 29th, and 30th, 2023, to survey the buildings. To do this, 2D plans were reviewed using the AutoCAD software based on previous documentation obtained and on-site corroboration. The case studies considered the solar incidence to define the photogrammetric survey schedules. It was prioritized that the sun did not generate shadows projected on the facades, determining the schedules of 7:00 am, 1:00 pm, and 5:00 pm as appropriate.

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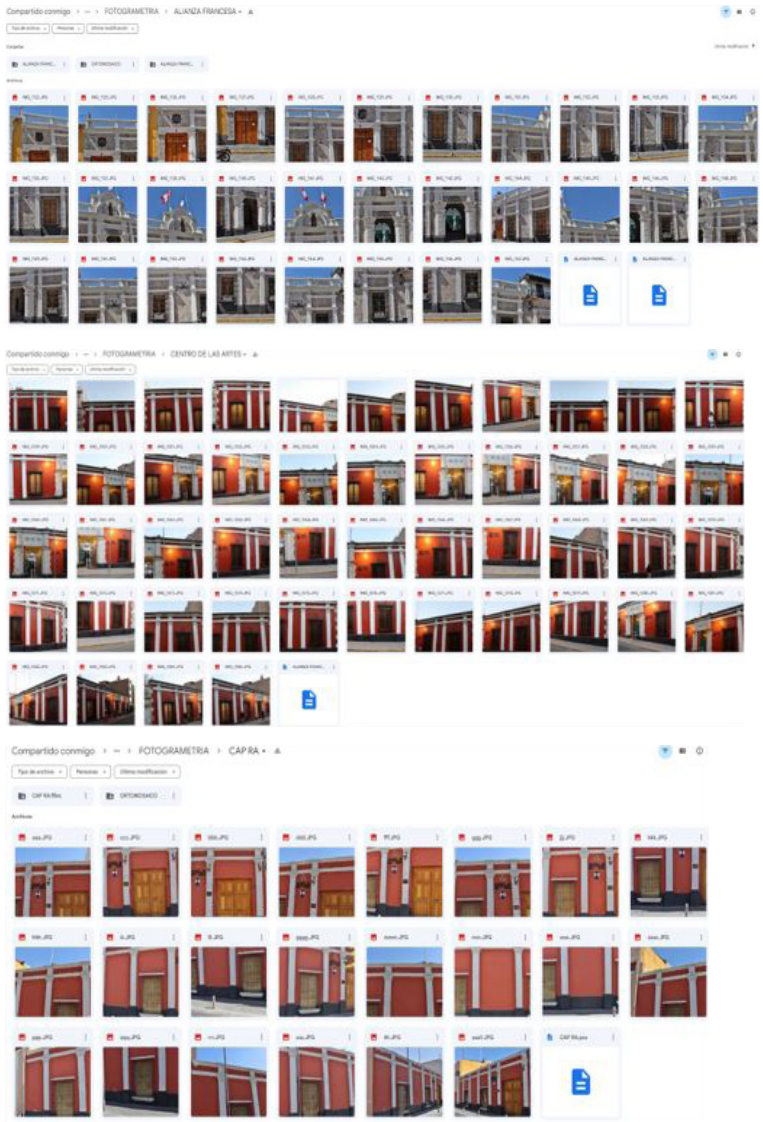


**Figure 1.** Photographic inventory obtained for the photogrammetric processing of the case studies. (a) Alianza Francesa (b) UCSP Arts Center (c) College of Architects CAP-RA. Source: Preparation by the authors.

The photographic survey consisted of taking data from sequenced photographs of the exterior and interior facades of the building (Figure 1). The photographic survey shots were taken using mass data capture techniques with a Canon DS126761 Professional Camera -and tripod. The image survey process was conducted on the exteriors of the houses based on close-up object shots.

The graphic data was processed in the Metashape software from Agisoft, where the images are integrated to achieve point clouds that are concatenated to form polygons that result in a three-dimensional model (Figure 2). By applying this technique, it is possible to conserve the original details. One hundred photographs were taken at 7:00 am for CAP-RA, 1:00 pm for Alianza Francesa, and 5:00 pm for the UCSP Arts Center. An average of 30 photos per building were documented, with an image capture period of 10 to 15 minutes per facade. The images obtained constituted a reference catalog for

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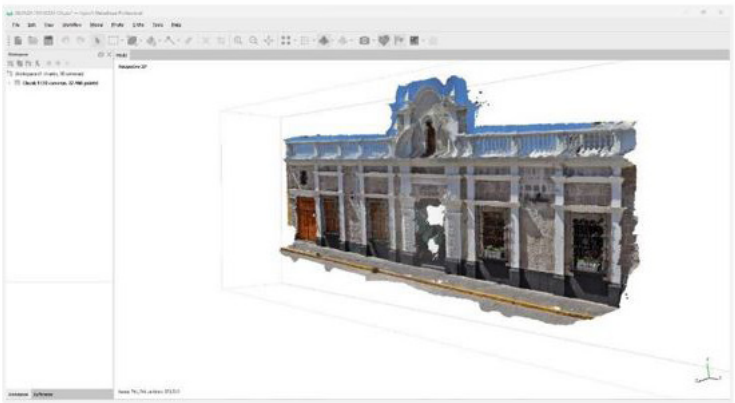
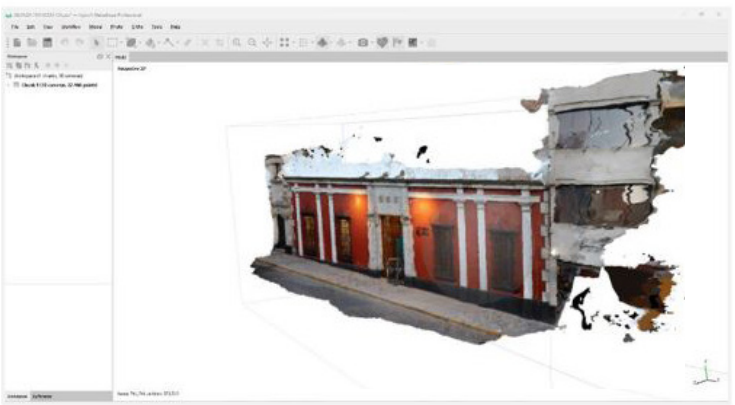
**Figure 2.** 3D models obtained from the photogrammetric survey. (a) Alianza Francesa (b) UCSP Arts Center (c) College of Architects CAP-RA. Source: Preparation by the authors.

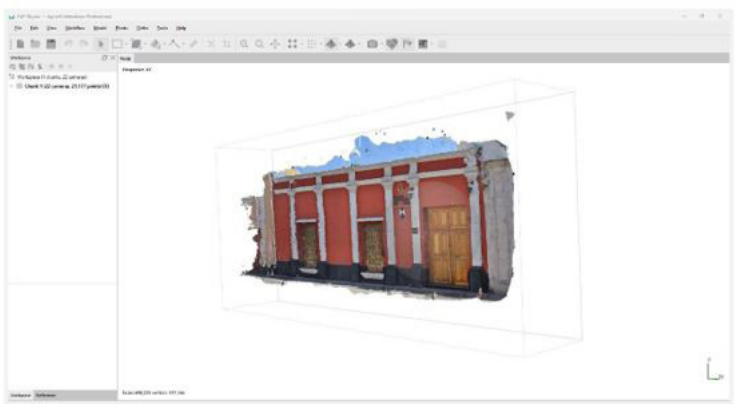
(a)



(b)



(c)



the subsequent analysis and processing of information for the diagnosis to be performed. The 2D and 3D models allowed comparison of the case studies' spatial, constructive, and stylistic evolution data.

A 2D redrawing was made in AutoCAD using the orthophotos obtained, obtaining accurate and detailed elevations of the case studies' main facades (Figure 3). This result was an invaluable tool for the comparative analysis of the main formal components.

Plans were also made in AutoCAD 2D to analyze the spatial qualities of the case studies. It should be noted that the ground

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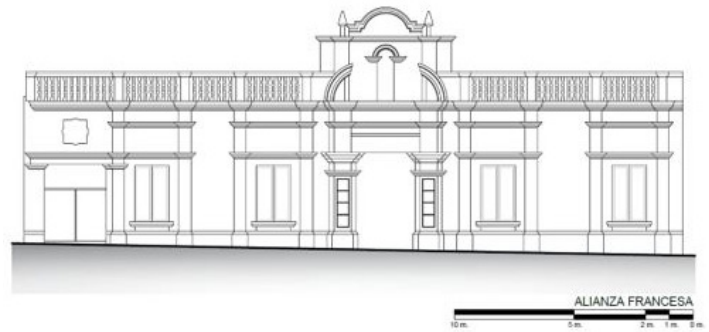
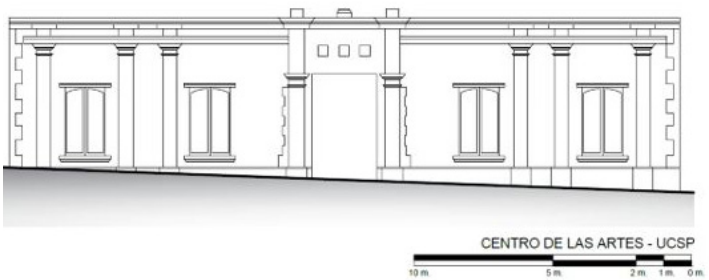



(a)




(b)


(c)

**Figure 3.** Redrawing the facades of the case studies. (a) Alianza Francesa (b) UCSP Arts Center (c) College of Architects CAP-RA. Source: Preparation by the authors.

floor was used for Alianza Francesa because it was the most representative of the period studied; the UCSP Arts Center and the College of Architects have only one floor.

A comparative analysis of the case studies was conducted at spatial, constructive, and stylistic levels with the information obtained. At a spatial level, a comparison was made of the floor plans of the selected buildings: the built and open circulations, recurrence of courtyards and areas of bigger and smaller rooms, and the building's general morphology at a volumetric level were compared. At a constructive level, the original spaces of the conditioned and newly fabricated areas were distinguished; it was considered that, in all cases, the buildings had varied their original use of housing. The wall covering, walls, and roofs were also evaluated. At a stylistic level, the comparative analysis of the facades was made for walls, compositional elements, building details, entrance, modifications, and finishing.

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# RESULTS

## Spatial analysis

The spatial conditions of the ***casonas*** were evaluated based on the characteristics of their main architectural components, and quantitative and qualitative data were considered to understand how the buildings have adapted to new requirements in terms of uses and users. The spatial relationships between components also determined the extent to which spatial adaptations have been required for the roles they currently perform. It was also verified that the spatial evolution of the architecture has conditioned its shape, which is directly related to the degree of alteration presented by each case study. The following spatial analysis parameters were used for this research (Table 2):

- Surfaces of larger and smaller rooms
- Circulations
- Built and open
- General morphology of the building at a volumetric level
- Recurrence of courtyards

The comparative matrix highlights that the largest spaces are between 70 $m^2$ and 80 $m^2$ and are used mainly as auditoriums or multipurpose halls. The smallest rooms are between 30 $m^2$ and 36 $m^2$, with the priority use being for offices. As for the circulations, the recurrence of courtyards connected by slopes is evident, with a hallway as the primary access to the houses. This is the typology of a traditional Arequipa courtyard house. The percentage of full or built-up space is between 60% and 80% of the house's total area, which leaves 20% to 40% as empty or free areas, where it should be mentioned that in no case are the open spaces used for vehicle parking. The morphology of the case studies follows the spatial typology of a courtyard house, with Alianza Francesa and the UCSP Arts Center linear, in contrast to the CAPRA College of Architects, which has a grouped morphology. This is due to the addition of land to the initial house. In all cases, the courtyards have been preserved as organizing components of spaces and activities.

## Constructive analysis

Regarding the construction systems, it can be mentioned that the evolution in the built heritage of Arequipa can be seen in the Viceregal architecture of the 16$^{th}$, 17$^{th}$, and 18$^{th}$ centuries by Castilian architects in principle and product of the mixing of its end. This learning, interpretation, and response condition means the buildings have an "... almost vernacular architecture if it were not for the constant attention to foreign trends that provide some details" (Zúñiga Alfaro, 2022, p.111). The construction system of

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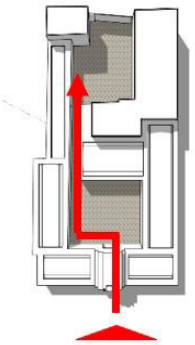
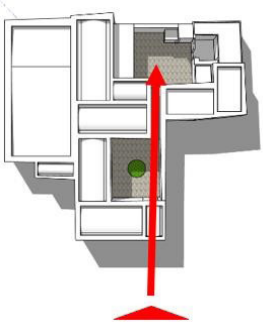
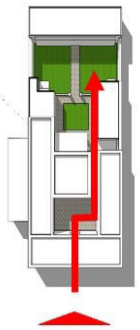
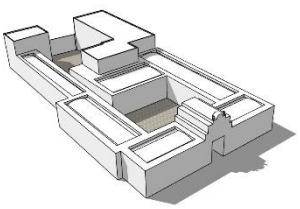
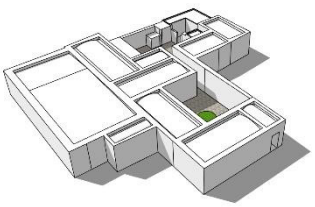
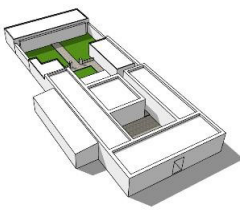
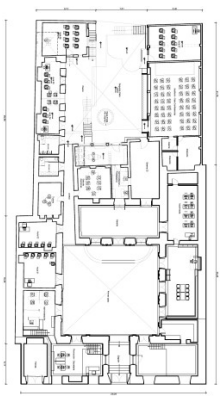
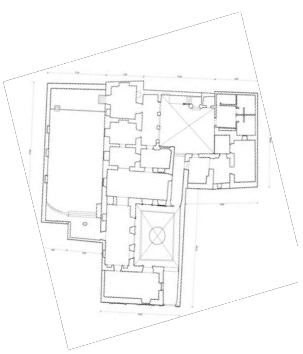
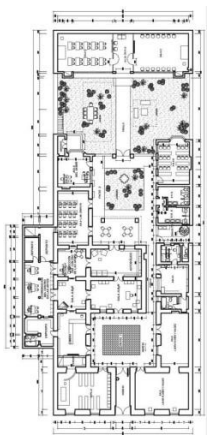
| | ALIANZA FRANCESA | COLLEGE OF ARCHITECTS - CA-PRA | UCSP CENTER FOR THE ARTS |
|---|---|---|---|
| Surface areas of smaller and larger rooms | Largest area: 80.02 m2.<br>Smallest area: 34.05 m2. | Largest area: 85.00 m2.<br>Smallest area: 36.00 m2. | Largest area: 70.13 m2.<br>Smallest area: 30.70 m2. |
| Circulations |  |  |  |
| Full and empty | Access by hallway to courtyard 1 and slope to courtyard 2<br>% full: 65.50% built<br>% of empty spaces: 34.50% courtyards | Access by hallway to courtyard 1 and slope to courtyard 2<br>% full: 80% built<br>% of empty spaces: 20% courtyards | Access by hallway to courtyard 1 and slope to courtyard 2<br>% full: 60% built<br>% of empty spaces: 40% courtyards |
| Building's general morphology at a volumetric level |  |  |  |
| | Volumetry of elongated courtyard house conditioned to rectangular Mediterranean plot. | Standard courtyard house volumetry with additions to the original plot, extensions for services, and auditorium. | Volumetry of elongated courtyard house with back door, conditioned to rectangular Mediterranean plot. |
| Recurrence of courtyards and relationship with adjoining spaces |  |  |  |
| | Courtyard 1 has a direct relationship with the entrance hall and adjacent rooms. Courtyard 2 has a direct relationship with vertical spaces and circulations. | Courtyard 1 has a direct relationship with adjoining spaces and an indirect one with the main auditorium. Courtyard 2 has a direct relationship with service spaces and indirect through colonnades. | Courtyard 1 maintains a direct relationship with adjoining spaces, an organizational purpose. Courtyard 2 has a direct relationship with functional spaces and gardens and an indirect relationship with the auditorium. |

**Table 2.** Comparative matrix of spatial parameters. Source: Preparation by the authors.

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the Arequipa mansions is mainly solved with a material known locally as ashlar (ignimbrite), later adding brick additions in vaults and floors. Boulder stone is also used for floors and foundations, as lime, sand, and earth are used for wall plaster. Wood is scarce and is used for furniture and carpentry (Burga, 2010).

According to these particularities, the research sought to analyze the main structural components of the case studies. Their original structure, comprising walls and ignimbrite roofs, was valued, and so was their level of conservation, while the original structures of the new extensions were appreciated and differentiated. It should be noted that only the first floors of the case studies were analyzed because they are the ones from the Republican period. The parameters measured were the following (Table 3):

- Wall construction system
- Roof construction system
- Original rooms
- Recent rooms

| | ALIANZA FRANCESA | COLLEGE OF ARCHITECTS - CAPRA | UCSP CENTER FOR THE ARTS |
|---|---|---|---|
| Wall construction system | 0.80 to 1.20 m wide ashlar and brick walls<br>It does not have an outer coating | 0.90 to 1.20 m wide ashlar and brick walls<br>It has a coating | 0.60 to 0.75 m wide ashlar and brick walls<br>It has a coating |
| Roof construction system | Roof with barrel vaults run in original spaces | Roof with barrel vaults run in original spaces | Flat roofs with plate and ashlar structures in original spaces |
| Original rooms | 80% of the building's structures. | 90% of the building's structures. | 70% of the building's structures. |
| Recent rooms | 20% of the building's structures. | 10% of the building's structures. | 30% of the building's structures. |

**Table 3.** Comparative matrix of the constructive parameters of the case studies. Source: Preparation by the authors.

From the results obtained, the width of the ashlar walls stands out, which in the case of the houses with barrel vaults is greater than houses with flat plate roofs, obtaining widths between 0.80 m and 1.20 m for the walls with vaulted roofs, and 0.60 m to 0.75 m for the walls with plate roofs. In all cases, coating was found on the interior walls. As for the level of conservation of the house's original structure, it is evident that between 70% and 80% have been preserved, with modifications of 10% to 30% of the total structure. This is due to possible extensions and/or losses due to seismic movements.

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## Stylistic analysis

For this analysis, the elevations of the buildings shown by photogrammetry and redrawn in 2D were used, identifying the following components (Table 4):

- Walls
- Compositional elements
- Building's details
- Entrances
- Modifications
- Finishes

**Table 4.** Comparative matrix of the case studies' stylistic parameters. Source: Preparation by the authors.

| | ALIANZA FRANCESA | COLLEGE OF ARCHITECTS - CAPRA | UCSP ARTS CENTER |
|---|---|---|---|
| Walls | Stone block walls without any type of coating. | Stone block walls with paint finish | Stone block walls with paint finish |
| | Ashlar and brick walls | Ashlar and brick walls | Ashlar and brick walls |
| Compositional elements | Has a stone plinth | Has a stone plinth | Has a stone plinth |
| | 8 semi-detached pilasters with their respective simple cornices that mark the façade's 4 windows | 5 semi-detached pilasters with continuous cornice flanking 2 window openings, and 1 door opening. | 6 semi-detached pilasters with continuous cornice flanking the 4 window openings. The openings near the entrance do not have pilasters. |
| | Rectangular windows with wooden carpentry and simple iron grilles | 2 rectangular windows with wooden carpentry and iron grilles | 4 rectangular windows with wooden carpentry and iron grilles with ornaments |
| Building's details | It has simple bases and pilasters with double cornice that accompany the window openings | It has bases and pilasters with simple double cornice | It has simple bases and pilasters with double cornice that accompany the window openings |
| | It has a simple double cornice | It has a simple double cornice | It features a simple cornice |
| Entrance | The façade's entrance has two wide pilasters with details ornamented with texao flowers or similar. Double cornice and with ornament under it. | The entrance is simple, without any ornament or symmetry. | The façade's entrance is unique, with two simple pilasters with capitals flanking it. The frieze is simple, with 3 centered quatrefoils that break the cornice's continuity |
| | It does not have a cantilever | It does not have a cantilever | It does not have a cantilever |
| | It has a semicircular upper cornice flanking a thin opening | It has an elongated upper cornice over the entire facade | It has an elongated upper cornice over the entire facade |
| | The pilasters end in ornamental elements | It has pilasters with finials on capitals that stand out from the upper cornice | It has pilasters with finials on capitals that stand out from the upper cornice |
| Modifications | An additional opening is identified on the left side as a door, cutting the house's symmetry. | No relevant modifications | No relevant modifications |
| Finishes | As a finishing touch, some balusters follow the rhythm of the pilasters | N/A | As a finishing touch, there are three ornamental elements. |
| Style | Neo-renaissance | Neoclassical | Neoclassical |

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The comparison between the mansions of Alianza Francesa, the CAPRA College of Architects, and the UCSP Arts Center revealed significant variations in the use of stock block walls, compositional elements, and architectural details, which reflect different and similar aesthetic and functional approaches in their designs.

Alianza Francesa opts for a facade without coating, where the natural texture of the stone block is preserved. It has ornamental and structural compositional elements that are recurrent in the mansions of the Republican era, such as the attached pilasters, simple cornices, rectangular windows with wooden carpentry, and iron grilles. It is evident that the entrance of this house denotes a more elaborate and ornamental design than the others. Including an additional opening modifies the original symmetry, suggesting a functional adaptation.

On the other hand, the College of Architects – CAPRA introduced a paint finish on the stone blocks. The simplification of compositional elements, such as the reduction of the number of pilasters and the presence of a less ornate entrance, suggest an inclination towards functionality and simplicity of its composition.

The UCSP Arts Center also applied paint to the stone blocks, maintaining uniformity with the College of Architects. However, it is distinguished by more pilasters flanking the window openings without pilasters near the entrance and by the inclusion of ornaments in the window's iron grilles. The entrance, while unique, is still relatively simple compared to the Alianza Francesa's, indicating a fusion of tradition and simplicity.

While the Alianza Francesa wants to distinguish itself with its entrance, the CAPRA College of Architects and the UCSP Arts Center seek a balance between tradition and modernity, using color and simplifying elements to adapt to contemporary needs. The diverse approaches reflect the flexibility of stone blocks as a material and their ability to adapt to different architectural expressions.

## DISCUSSION

### Interpretation of the results

The historical architecture of societies forms a hallmark of their identity and constitutes an unquestionable part of the collective memory. Knowing and valuing this heritage are inescapable conditions for its preservation, so it becomes a prevailing need to incorporate the buildings and architectural styles of the Republican period of the monumental area of Arequipa into the city's body of intangible cultural heritage to the same degree as the exponents of the architecture of other historical periods are.

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More than 50% of the buildings from the Historic Center's Republican era are not declared as cultural heritage, exposing them to serious deterioration risks. The importance of these buildings having a particular consideration about their heritage value does not lie in issuing a normative declaration that can be more or less ambiguous, but in the fact that the citizenry recognizes them as such. The citizen's estimation, which in the long run can be translated into the well-known declaration, will protect these constructions from suffering partial or total alterations, abandonment, or even demolition.

Photogrammetric techniques have contributed to documenting the selected buildings. However, certain limitations of the methodology have been revealed. Although photogrammetry has been especially useful for reviewing facades and facilitating the stylistic analysis of the exterior architectural expression, the review of interior spaces is challenging due to the complexity of linking the survey of each space. Given this, the use of laser scanners as a complement to photogrammetry was assessed. Also, it was impossible to complete the survey of the roofs from above, which hindered the possibility of generating complete volumetry models. Hence, drones are recommended for taking aerial photographs.

Notwithstanding this, it is considered that results have been obtained that allow showing the relationships between the spatial, constructive, and stylistic qualities of the analyzed buildings. The documentation obtained expands the existing knowledge about the characteristics of the mansions, knowledge whose dissemination contributes to their assessment by the community and their care and conservation.

From the information obtained, it is highlighted that, in terms of space, the spaces with the largest footage, ranging from 70 $m^2$ to 85 $m^2$, stand out, which have been transformed and adapted to auditoriums or classrooms, demonstrating the adaptive capacity of this heritage architecture. The smaller spaces have an average of 30 $m^2$, enough area to provide office uses, among others.

The circulations are directly related to the courtyard house typology of Arequipa mansions, where spaces such as the hallway, the slopes, and the courtyards maintain a constant structure despite having different stylistic characteristics on their facades. The house's morphology tends to be linear, except for the College of Architects CAP-RA, where the house's shape is understood as a composition by addition. Whatever the case, the courtyards organize these buildings' new uses.

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On the other hand, the balance between built and open determines that the occupied area ranges between 60 $m^2$ and 80 $m^2$, keeping the courtyards, hallways, and slopes as open spaces for everyday use, including flexible living spaces, which adapt to the requirements of their current roles. It is important to note that in no case are the open areas used for parking or similar purposes.

Regarding the construction conditions, in all cases, walls were found in a good state of conservation, which highlights the use of ignimbrite in box walls with ashlar and brick configurations with dimensions that for the Alianza Francesa and the College of Architects CAP-RA range between 0.80m and 1.20 m in total width, while in the Arts Center, it has walls from 0.60 m to 0.75 m. This is due to the type of roof, which in the first two cases are ashlar vaults, and in the latter, it is plate with ashlar. The percentage of the original fabric on the first floors ranges between 70% and 90%, with the College of Architects CAP-RA having the most alterations because its spaces follow composition by addition, and one of the original courtyards was transformed into an auditorium. It is worth mentioning that the Alianza Francesa, which is 80% original on the first floor, has grown in height to accommodate spaces of up to three floors with contemporary construction systems. Despite this extension, the percentage of the original unaltered area is valuable.

Among the styles of the Republican era, the neoclassical language stands out, as it predominates in the city's central area, with the Arts Center and the College of Architects CAP-RA exhibiting this style on their facades. On the other hand, the Alianza Francesa has a neo-Renaissance facade with ornamentation and sumptuous features. Those in the neoclassical style have "simple" and less ornate features, where pilasters attached to the wall with cornices in column capital and as a roof finial are used. The openings are part of the facades always contained between these components. The facade of the College of Architects CAP-RA is the smallest; its composition is 5 pilasters with continuous cornices and 3 openings, of which one is the entrance to the building. The Arts Center has 6 terraced pilasters with cornices flanking 4 windows, two on each side of the main entrance. The facade of the Alianza Francesa comprises 8 terraced pilasters with continuous cornices and 4 windows facing the street arranged on both sides of the main door. In the case of neoclassical buildings, the entrances are simple and are contained in the pattern of pilasters and cornices (double in the College of Architects CAP-RA and single in the UCSP Arts Center). In the Alianza Francesa, an ornamental finial on its entrance stands out from the building's general volumetry, a detail that, together with the ornate capitals of its composition, gives harmony to the whole.

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## CONCLUSIONS

Photogrammetry was used to thoroughly survey the buildings and the three exterior facades. As for the survey of interior spaces, roofs, or structural details, photogrammetry with close-up object shots was insufficient due to the complexity of the mansions, the lighting levels, and the time for the photographic process. Using instruments and techniques with a higher accuracy level is recommended to survey this type of property properly.

As for the characteristics that the analysis allowed validating, it turns out that at a spatial level, the configuration of the mansions, regardless of the time or style, obeys a courtyard house organization, distributed from an entrance hallway, two courtyards joined by a slope, and side rooms with windows and doors to the courtyards.

Morphologically, the mansions tend to be linear, except for the College of Architects CAP-RA, which shows a grouped configuration. The built and open percentages measured range between 60% and 80% for built and 20% and 40% for open. The uses in the open spaces are functional and organizational, appropriate for courtyards, not vehicles.

In all cases, ignimbrite walls with box walls are evident. The roofs in the Alianza Francesa and the College of Architects CAP-RA houses are barrel vaults, and their wall thicknesses range between 0.80 m and 1.20 m. The UCSP Arts Center has plate roofs and stone block walls with widths between 0.60 m and 0.75 m.

The percentage of conservation of the original fabric in the studied buildings is greater than or equal to 70%, which denotes the adaptability of the original structures to new uses, education, and management. In the case of Alianza Francesa, the extensions followed structures with contemporary materials developed at the bottom of the lot, which respect the building's original facade.

The stylistic characteristics on the facades of the case studies follow the neoclassical in the College of Architects CAP-RA and the UCSP Arts Center and the neo-Renaissance for Alianza Francesa, the former with more straightforward features, without finials in the building's general volumetry. On the other hand, in the latter, there is a higher level of ornamentation and a finial that stands out from the general volumetry of the building.

## CONTRIBUTION OF AUTHORS CRediT

Conceptualization, D.M.-M., F.C.-G., T.M.-S., S.C.-P. y D.L.M.-P.; Data curation, D.M.-M., F.C.-G., T.M.-S., S.C.-P. y D.L.M.-P.; Formal analysis, D.M.-M., F.C.-G., T.M.-S., S.C.-P. y D.L.M.-P.; Acquisition of financing, D.M.-M.; Research, , D.M.-M., F.C.-G., T.M.-S., S.C.-P. y D.L.M.-P.; Methodology, D.M.-M., F.C.-G., T.M.-S., S.C.-P. y D.L.M.-P.; Project management, D.M.-M.; Resources, D.M.-M.; Software, D.M.-M., F.C.-G., T.M.-S., S.C.-P. y D.L.M.-P.; Supervision, D.M.-M., F.C.-G., T.M.-S., S.C.-P. y D.L.M.-P.; Validation D.M.-M., F.C.-G., T.M.-S., S.C.-P. y D.L.M.-P.; Visualization,

D.M.-M., F.C.-G., T.M.-S., S.C.-P. y D.L.M.-P.; Writing - original draft, D.M.-M., F.C.-G., T.M.-S., S.C.-P. y D.L.M.-P.; Writing - proofreading and editing, D.M.-M., F.C.-G., T.M.-S., S.C.-P. y D.L.M.-P.

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## BIBLIOGRAPHIC REFERENCES

Almagro, A. (2000). Fotogrametría para arquitectos. El estado de la cuestión [Sesión de conferencia]. Actas del VIII Congreso de Expresión Gráfica Arquitectónica, Barcelona, España. http://hdl.handle.net/10261/19821

Arévalo, J. M. (2004). La tradición, el patrimonio y la identidad. *Revista de Estudios Extremeños*, 60(3), 925-956. https://www.dip-badajoz.es/cultura/ceex/reex_digital/reex_LX/2004/T.%20LX%20n.%203%202004%20sept.-dic/RV000002.pdf

Burga, J. (2010). *Arquitectura vernácula peruana. Un análisis tipológico*. Colegio de Arquitectos de Perú, Perú.

Gonzales Ruiz, L., Brondi Rueda, F., Wołoszyn, J. E Imbertis Herrera, A. (2020). Virtualizando el patrimonio cultural rupestre: el caso del sector "X" en Toro Muerto – Arequipa, Perú. *Devenir*, 7(13), 77-102. https://doi.org/10.21754/devenir.v7i13.765

Instituto Municipal de Planeamiento de Arequipa [IMPLA] (2017). Plan de Desarrollo Metropolitano PDM 2016-2025. *Publicaciones IMPLA, PDM 2016-2025.* https://impla.gob.pe/publicaciones/pdm-2016-2025/

Ministerio de Cultura [MINCUL]. (s.f.). ¿Qué hacemos? Ministerio de Cultura, Información institucional. https://www.gob.pe/institucion/cultura/institucional

Moyano, G. (2017). El uso de fotogrametría digital como registro complementario en arqueología. Alcances de la técnica y casos de aplicación. *Comechingonia.Revista de Arqueología, 21*(2), 333-351. https://doi.org/10.37603/2250.7728.v21.n2.26789

Natividad Vivó, P.Y Calvo López, J. (2010). Levantamiento arquitectónico mediante fotogrametría multimagen aplicada a las Torres de Cuarte. *III Jornadas de Introducción a la Investigación de la UPCT*, (3), 9-11. http://hdl.handle.net/10317/2022

Picon-Cabrera, I., Rodríguez-Gonzálvez, P., Toschi, I., Remondino, F., y González-Aguilera, D. (2021) Building Reconstruction and Urban Analysis of Historic Centres with Airborne Photogrammetry. *Informes de la Construcción, 73*(562), e398. https://doi.org/10.3989/ic.79082

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ISSN Digital 0719-6466



Sánchez López, A. V. G. (2021) Propuesta de una metodología para desarrollar y evaluar técnicas de fotogrametría como herramientas para la realización del mapeo de patologías en elementos patrimoniales [Tesis de Mágister, Universidad Autónoma de Aguascalientes]. *Repositorio Bibliográfico Universidad Autónoma de Aguascalientes*. http://hdl.handle.net/11317/2186

UNESCO, World Heritage Convention (2000). Centro Histórico de la Ciudad de Arequipa. Report on the reactive monitoring mission. Historical Centre of the city of Arequipa, World Heritage site, Peru Property inscribed on the World Heritage List in 2000 under the criteria C (i), (iv). https://whc.unesco.org/en/list/1016/

Villar, F. A. (2018). Fotogrametría: un aporte sustancial a la lectura de paramentos del sitio ingenio Lastenia (Dpto. Cruz Alta, Tucumán). La *Zaranda de Ideas, 16*(1), 45-57. https://www.scielo.org.ar/pdf/zi/v16n1/v16n1a04.pdf

Zúñiga Alfaro, Á. (2015). El neoclasicismo en la arquitectura de Arequipe, Lucas Poblete, alarife del siglo XIX en M. López, W. Yépez, A. Miranda, C. Quequezana, E. Quequezana, A. Cardona, A. Ramos, J. Bourocle, G. Galdos, A. Málaga, N. Benavente, G. Ballón, Á. Zúñiga, C. Acurio, L. Calatayüd, O. Urday, W. Palomino, G. Ríos, R. Castillo, J. Llanque, M. Huaco, M. Málaga, M. Gómez, L. Maldonado, J. de la Serna, S. Encalada, E. Quiroz, R. Nuñez y Y. Alemán, *Arequipa Patrimonio Cultural de la Humanidad. Reflexiones a los quince años de su declaratoria.* (1 ed., pp. 165-197). DDCA, Publicont SAC. https://www.academia.edu/27340733/Arequipa_Patrimonio_Cultural_de_la_Humanidad_Reflexiones_a_los_quince_a%C3%B1os_de_su_declaratoria

Zúñiga Alfaro, Á. (2022). *Origen y evolución de la vivienda colonial y el estilo mestizo en Arequipa*. Universidad Católica De Santa María