Digital Governance and Institutional Challenges in Rural Heritage Restoration: The Case of Caqui Hacienda in Chancay Valley, Peru

Oscar Miranda-Hospinal [a], *David Valle-Cruz* [b], *Carlos* Cuadra [c]

[a] Faculty of Civil Engineering, National University of Engineering, Lima, Perú, omiranda@uni.edu.pe .

[b] Unidad Académica Profesional Tianguistenco, Universidad Autónoma del Estado de México, davacr@uaemex.mx.

[c] Faculty of System Science and Technology, Akita Prefectural University, Yurihonjo, Japan, carlos@akita-pu.ac.jp.

Submitted: 31 January 2025, Revised: 26 March 2025, Accepted: 21 April 2025, Published: 19 May 2025

Abstract: This study aims to analyze the challenges faced by local governments in the preservation and restoration of rural historical buildings in Peru, using the Caqui Hacienda in the Chancay Valley as a representative case. It is proposed that the rigidity of Peruvian regulations on cultural heritage, combined with the limited technical and budgetary capacity of local administrations, represents a significant obstacle to the recovery of these properties. Additionally, other barriers are identified, such as the weak implementation of digital governance, lack of institutional coordination, and limited availability of accessible digital platforms for citizens. Through an exploratory qualitative approach that combines historical analysis, regulatory review, field observation, and surveys of public works professionals, the study seeks to evaluate how the adoption of technological tools and the modernization of public policies could contribute to a more efficient, transparent, and sustainable management of cultural heritage. The expected results aim to provide evidence on the need for regulatory reforms and institutional strengthening and to propose the use of emerging technologies, such as artificial intelligence, in the monitoring and restoration processes of historical heritage in rural contexts.

Keywords: Digital governance, cultural heritage, historical buildings, transparency, restoration, public sector.
Poster, DOI: https://doi.org/10.59490/dgo.2025.938

1. Introduction

The preservation of rural historical buildings is closely linked to the effectiveness of digital governance in the management of cultural heritage. The implementation of digital tools can enhance transparency and efficiency in decision-making, particularly in public projects involving heritage conservation. However, in rural areas such as the Chancay Valley, the low level of digitalization in local government processes may hinder initiatives aimed at restoration and protection. Studies on e-government adoption indicate that insufficient digital infrastructure, budget constraints, and limited institutional capacity negatively affect the ability of public administration to effectively manage historical sites (Buyannemekh, Gil-Garcia, & Gascó-Hernández, 2023).

In this context, the role of artificial intelligence (AI) and digital monitoring systems could be explored as potential enablers to enhance heritage conservation efforts. AI-driven platforms have been successfully integrated into public works management, improving project oversight and reducing inefficiencies (Miranda-Hospinal et al., 2023). By leveraging AI and digital platforms, local governments in Peru could establish data-driven strategies to monitor and prioritize the restoration of historical sites. Nevertheless, achieving such advancements requires not only technological investment but also policy alignment and capacity-building programs to ensure effective governance in heritage preservation (Goos & Savona, 2024).

In the Chancay River Valley in Peru, there are several rural historical buildings that are abandoned and, as a result,

undergoing deterioration. The Caqui country house or hacienda, located in the district of Aucallama, was selected as a representative example to analyze the reasons behind the lack of building's maintenance and to propose a research project to recover this historical structure. The property legal status is a critical issue that prevents intervention to recover and protect this cultural heritage. However, it is also considered that the level of digital governance implemented in the local administration could be a contributing factor to this situation.

The current state of the old historical constructions in the lower Chancay Valley is critical due to the lack of maintenance and attention they have received, as they represent the former model of production under the control of a landowner—a model in which, today, production is managed in some cases through a cooperative system and in others by individual farmers. In this territory, it is possible to find unique human settlements with emblematic cultural traditions and historical buildings that are undergoing deterioration and face latent extinction. Near the town of Caqui, the old landowner's country house, which still stands, is distinguished not only by its architecture but also by the artistic expression that can still be seen in the wall paintings and inside a small chapel.

The historical structure restoration of Caqui requires a detailed study of its original architecture, as well as the recovery of the paintings. As a reference, there is a replica of this building in Japan. It was built in a theme park called Little World, which features representative constructions from different parts of the world. The old Caqui farmhouse was selected as a typical Peruvian building, and the replica has dimensions similar to those of the original located in Caqui. The paintings were also reproduced; however, some of them are not exactly the same as those found in Caqui. Additionally, some of the furniture displayed in the theme park corresponds to the original furniture from the old Caqui farmhouse. Therefore, this replica is considered a potential model for reconstructing the original building.

The national government of Peru has given due importance to the implementation of digital government through a plan called the Digital Policy for Digital Transformation. Peru's e-government development index improved, reaching position 59 out of 193 evaluated economies. However, it is considered that differences still exist within the country, especially in small districts or localities where the level of digital government implementation remains low. Therefore, improving this implementation will primarily benefit citizens and will also support the management of other areas, such as the conservation of historical buildings.

2. The old Caqui Farmhouse

2.1 Construction Characteristics

The farmhouse analyzed in this study is in the village of Caqui, in the district of Aucallama, province of Lima, Peru. Figure 1 shows the location of Caqui on a Google map. The Caqui hacienda is situated on the left bank of the lower Chancay River valley, at an approximate altitude of 246 meters above sea level. It is built on a rocky outcrop that emerges from the geological formation known as La Bóveda Hill. The hacienda was managed by the Mujica family at the time of the Agrarian Reform implemented in 1968, which brought an end to the hacienda system and gave way to the cooperative system and, in some cases, the subdivision and distribution of land.

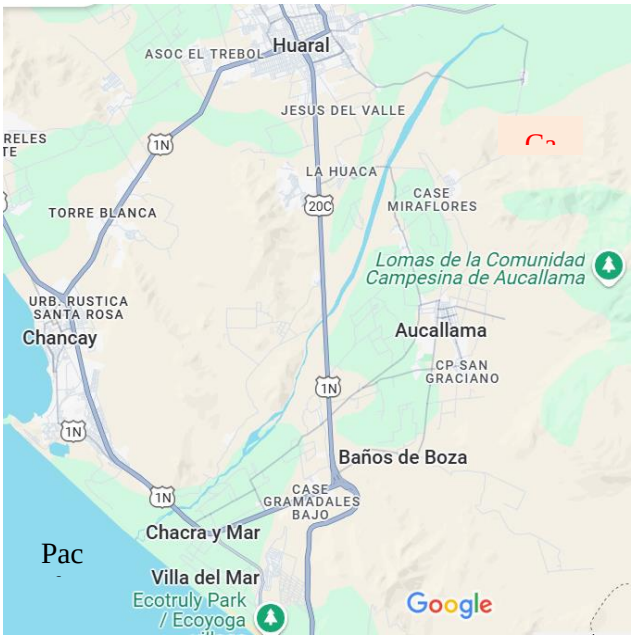

Fig. 1 – Location of Caqui (Google Map)

The architectural typology of the Caqui hacienda building corresponds mainly to a domestic residence (kitchen, dining room, bathrooms, etc.), in which the spaces are arranged around a central courtyard that provides light and ventilation and allows for the independence of each area. The house, being intended to accommodate the landowner and his family during their visits, includes spaces that facilitate the management of the hacienda, such as offices and reception rooms. Accordingly, it features a vestibule, a main courtyard, an entrance atrium, and a chapel—spaces that possess special infrastructure and in which particular attention was given to design and decoration. Figure 2 shows the floor plan of the Caqui hacienda.

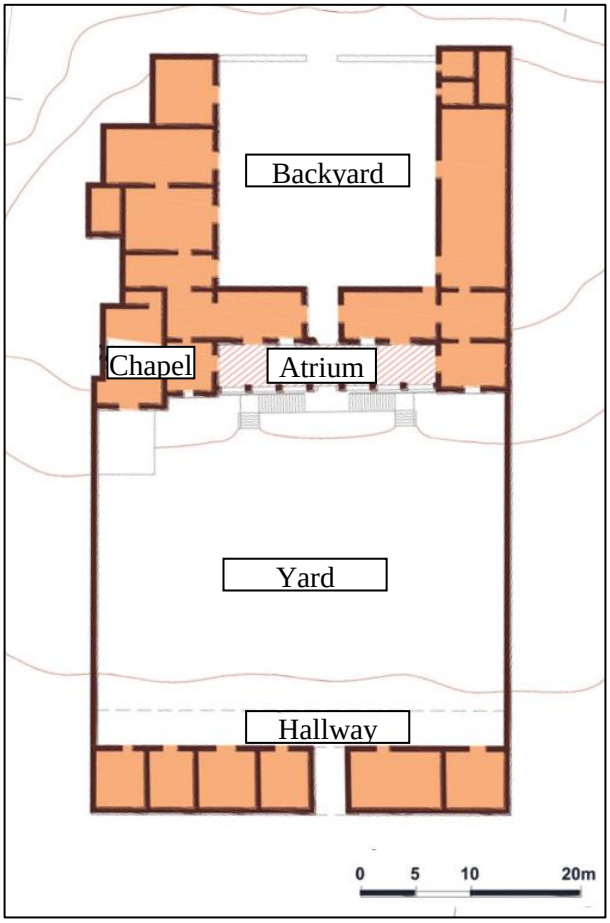

Fig. 2 – Plan view of the Caqui hacienda.

2.2 Comparison with the replica

A full-scale replica of the Caqui farmhouse can be found at the Little World theme park in Aichi Prefecture, Japan, as part of the World Buildings exhibition. This replica is considered a potential model for the reconstruction and restoration of the original Caqui farmhouse. Figures 3 to 6 below show a comparison of photographic details between the two buildings.

Fig. 3 – General view from hallway entrance (left replica, right Caqui farmhouse)

Fig. 4 – Detail of the exterior of Chapel (left replica, right Caqui farmhouse)

Fig. 5 – Detail inside the Chapel (left replica, right Caqui farmhouse)

Fig. 6 – Detail of the backyard (left replica, right Caqui farmhouse)

When comparing the replica with the current structure of the Caqui farmhouse, it can be observed the severe deterioration of both the building itself and the artwork on the walls, especially inside the chapel. It is therefore clear that the well-preserved replica can be used as a model to propose the repair and/or restoration of this historical structure.

3. The role of the local government

The building analyzed in this study is managed by the local municipal government of the Aucallama district. Figure 7 shows the municipal building. The district of Aucallama has an area of 717 km^2 and a population of 19,464 inhabitants (2017).

Fig. 7 – Municipal building of Aucallama district.

According to the government's website, digital governance has been implemented and users can access care and services online. In addition, information is available to ensure or verify governmental transparency. However, information about cultural heritage or historical buildings is more difficult to obtain. This information should be available not only to researchers or individuals interested in such buildings, but it could also help promote tourism in the area by showcasing not only recreational facilities but also the cultural aspects of the district. On the other hand, the development of proposals for the reconstruction or restoration of historical buildings can be carried out in collaboration with institutions such as universities, which engage in activities that include social outreach

4. Final comments and Future directions

This poster outlines insights into the role of digital government and AI governance in addressing institutional challenges within heritage restoration projects, specifically in rural contexts like the Caqui Hacienda case in Peru.

Firstly, it highlights the potential gap between national-level digital transformation initiatives and their practical implementation at the local government level. Although Peru's national digital transformation policies have significantly advanced, achieving noticeable global recognition, local disparities persist, particularly in rural areas. This disconnect exposes that digital government efforts should go beyond mere policy formulation, actively engaging in the capacitation and technological empowerment of local governments to warrant coherent and inclusive digital progress. Secondly, the research emphasizes that robust digital governance frameworks and AI-driven platforms can profoundly enhance heritage management processes. By integrating AI tools into public administration, local governments could foster decision-making transparency, enhance monitoring efficiency, and strengthen public participation and accountability in heritage preservation efforts. Moreover, this poster highlights the importance of regulatory flexibility and institutional collaboration as critical enabling factors for digital and AI governance in the heritage sector.

Future research should further explore the specific mechanisms through which digital governance and AI can be more effectively implemented at the grassroots level, suggesting models that can be replicated and adapted to various rural and resource-constrained settings globally. For this reason, future work will explore this phenomenon through empirical analysis, beginning with a survey (See Appendix A).

5. Acknowledgements

Use of AI*: During the preparation of this work, the authors used ChatGPT to assist in the design of a survey to iterate and refine the questions (See Appendix A). After using this tool, the authors reviewed, edited, adapted the content as their own, and validated the outcome as needed, and take full responsibility for the content of the

publication.

6. References

Alvino, J., & Guzman, M. (2016). Archeology, architecture and art in Caqui, province of Huaral, Lima. *Devenir*, 3(6), 143–162. Universidad Nacional de Ingeniería. https://doi.org/10.15381/dev.v3i6.11676

Buyannemekh, B., Gil-Garcia, J. R., & Gascó-Hernández, M. (2023). Exploring emergent collaborations for digital transformation in local governments: The engagement of public libraries in the development of smart cities. *Public Policy and Administration*, 09520767231197600.

Goos, M., & Savona, M. (2024). The governance of artificial intelligence: Harnessing opportunities and mitigating challenges. *Research Policy*, *53*(3), 104928.

Miranda, O., Valle-Cruz, D., & Yrivarren-Lazo, J. (2023). Perceptions of civil engineers on the development and adoption of AI in the Peruvian public sector. In *Handbook of Research on Applied Artificial Intelligence and Robotics for Government Processes* (pp. 173–193). IGI Global. https://doi.org/10.4018/978-1-6684-5624-8.ch009

Presidencia del Consejo de Ministros, Secretaría de Gobierno y Transformación Digital, Perú. (2023). *Política Nacional de Transformación Digital*. https://www.gob.pe/ciudadaniadigital

Appendix A

1. Perception of the current situation and the role of digital government

- **To what extent do you agree that digital government could improve the management and conservation of historical heritage?**
  (Scale from 1 to 7, where 1 is strongly disagree and 7 is strongly agree)
- **Do you believe that the use of digital technologies can help prevent the deterioration of historical heritage?**
  (Options: Yes / No / Not sure)

---

2. Institutional capacities and training

- **Do you consider it necessary for the Ministry of Culture to provide training to local governments on the use of digital technologies for managing and restoring historical heritage?**
  (Scale from 1 to 7, where 1 is strongly disagree and 7 is strongly agree)
- **What level of knowledge do you have regarding artificial intelligence (AI) and digital tools applied to heritage conservation?**
  (Options: Basic / Intermediate / Advanced / I have no knowledge)

---

3. Technical and operational barriers

- **What do you consider to be the main barriers to implementing technologies such as AI in the management and restoration of historical heritage? (Select all that apply)**
  - Lack of funding
  - Lack of training
  - Lack of digital infrastructure
  - Lack of clear regulations
  - Other: _____

---

4. Regulations and the deteriorated state of heritage

- **Do you consider that the current regulations in Peru for intervening in heritage properties are too rigid in relation to the technical, economic, and operational capacity of local governments?**
  (Scale from 1 to 7, where 1 is strongly disagree and 7 is strongly agree)
- **Do you believe that the lack of modernization in heritage regulations has contributed to the abandonment, deterioration, or inability to restore numerous heritage buildings in the country?**
  (Scale from 1 to 7, where 1 is strongly disagree and 7 is strongly agree)
- **Considering international experiences like that of Japan—where preserving the façade and updating the interior is allowed—do you believe it is necessary to rethink and modernize Peru's heritage regulations to enable more sustainable and contextual restoration practices?**
  (Scale from 1 to 7, where 1 is strongly disagree and 7 is strongly agree)
- **What aspects of the current regulations do you think should be modernized to allow for more efficient, sustainable, and feasible restoration of historical heritage? (Select at least 3 options)**

  - Excessive or costly technical requirements
  - Extensive bureaucratic procedures
  - Inefficient authorization processes
  - Lack of differentiated criteria based on the value or type of property
  - Lack of integration with digital government and urban planning regulations
  - Little consideration of the local economic context
  - Other: _____

---

5. Transparency and access to heritage information

- **Do you believe that the process by which a site is declared historical heritage is accessible and transparent?**
  (Options: Yes / No / Not sure)
- **Do you think citizens and local authorities should have open access to the protocols, criteria, and resolutions used to declare a site as historical heritage?**
  (Scale from 1 to 7, where 1 is strongly disagree and 7 is strongly agree)

---

6. Expectations and opportunities of digital government

- **What benefits do you expect from the adoption of digital government in the management of historical heritage? (Select at least 3 options)**

  - Mayor transparencia en la asignación de fondos
  - Greater transparency in the allocation of funds
  - Reduction of bureaucracy in permit processes
  - Better access to heritage information
  - Improved planning and monitoring of restoration projects
  - More informed citizen participation

- **How likely do you think it is that AI will be implemented in heritage management in the next five years?**
  (Escala de 1 a 7, donde 1 es totalmente en desacuerdo y 7 totalmente de acuerdo)

---

7. Key stakeholders and citizen participation

- **Who should lead the implementation of digital government in the protection of historical heritage? (Select at least 3 options)**

  - Ministerio de Cultura
  - Ministry of Culture
  - Local governments
  - Academic institutions
  - Technology companies
  - International organizations

- **Do you believe citizens should have access to digital platforms to check the status of heritage properties and report their deterioration?**
  (Options: Yes, absolutely / Yes, with restrictions / No / Not sure)