

ARCHITECTURE HERITAGE and DESIGN

Carmine Gambardella

XXI INTERNATIONAL FORUM

Le Vie dei
Mercanti



World Heritage and Dwelling on Earth



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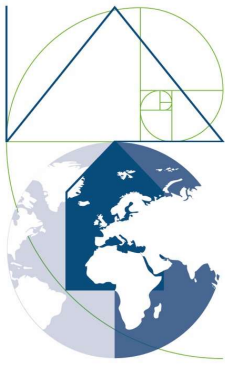
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Intervention strategies for the enhancement of the Peruvian route of the Inca royal path Qhapaq Ñan

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Abstract

Qhapaq Ñan, a UNESCO World Heritage Site, was a complex administrative communication and transport system that connected the immense territory of the Inca empire for over 30 thousand km, intercepting sites of great historical and cultural interest today, first of all the Sanctuary of Machu Picchu.

The consequences of climate change and the high tourist presence, which is mostly concentrated in Machu Picchu, are seriously jeopardizing the survival of this precious asset.

The heavy rains that hit the monuments produce dangerous infiltrations of water between the masonry structures, compromising their stability; the transit of people along the paths and stairways erodes the rock and the soil.

A further burden is the new airport, nearing completion, located a few kilometers from the entrance to the Sacred Valley of Machu Picchu, aimed at strengthening the national and international tourist network, with irreversible damage to the territory and local communities. For these reasons, in 2016, UNESCO included Machu Picchu in the list of "World Heritage Sites in Danger".

The present study proposes an alternative that can shift the tourist flow towards other sites intercepted by the Qhapaq Ñan, less known but equally rich in history, culture and art, including the archaeological site of Raqchi and the Q'eswachaka bridge, for which interventions are proposed aimed at improving their accessibility through the redevelopment of the existing infrastructures and the construction of temporary reception facilities in respect of the identity of the places.

Keywords: Sustainable tourism, UNESCO heritage, Peru, Qhapaq Ñan, Q'eswachaka bridge.

1. Premise

The enhancement of the cultural, landscape and intangible heritage of any country in the world is an important and often difficult commitment to sustain and guarantee. It is a delicate responsibility that often risks being conditioned by economic and power interests which more often than not favor the exploitation of cultural and landscape assets, neglecting the main objective, that is to say, the protection of the heritage.

The issue of enhancement tangible and intangible heritage is very extensive and complex and becomes even more so in contexts where political and economic instability do not allow for the planning and implementation of long-term protection interventions.

Among these is Peru, the cradle of important civilizations that have followed one another over time, each of which has profoundly marked the history of the country, leaving evidence of great value and a cultural heritage of inestimable value which is often the subject of interventions that have the sole purpose of increasing the tourist flow as much as possible by favoring the development of a "destructive mass tourism"; a phenomenon that is causing more and more trouble.

The prime example is the sanctuary of Machu Picchu, one of the twelve UNESCO World Heritage Sites. It is probably the most spectacular architectural work that the Inca Empire built during its years of greatest glory, the preservation of which is now in serious danger.

2. From cultural tourism to mass tourism

In Peru, tourism plays an important role in the country's economy and is considered by the government to be one of the main sectors to be developed.

The first flights over the Andes date back to 1928, with the Lima-Talara route, reserved for only six passengers. This was the period in which Machu Picchu received its first visitors, mainly scholars and archaeologists who came there to study and understand the nature of the sanctuary.

In the following years, a hotel plan was implemented which allowed, between 1940 and 1945, the birth of numerous state hotels in the cities with major tourist attraction.

Starting 1969, through the implementation of the COPESCO Plan and the PER-71/539 project, promoted by the Peruvian government with the collaboration of UNESCO, a series of regulations were issued and activities aimed at the restoration of monuments and the conservation of the Peruvian heritage.

Projects aimed at the development of cultural tourism were also launched, including the one on the Machu Picchu-Cusco-Puno-Desaguadero axis. The Tourist Development Plan of the Inca Region 1995-2005, prepared and commissioned by the Regional Council, has allowed the development of tourist activity in the last decade, through identified circuits. But, despite this, the attention of the whole world continued to be directed to the sanctuary of Machu Picchu which, in July 2007, was declared one of the seven wonders of the world by the institution New Open World Corporation (NOWC).

A series of projects followed such as the National Strategic Plan for Tourism - PENTUR 2005- 2015 and the Master Plan of the Qhapaq Ñan section. All tourist strategies that have generated an exponential growth of foreign visitors with the movement of masses of travelers from all over the world, intrigued and fascinated by so much beauty. But the tourism development policies that the Peruvian government has adopted seem to have led to the development of destructive mass tourism, which generates anthropic pressure higher than tolerable and which is increasingly causing concern.

In recent years, the most important archaeological sites in Peru have been greatly threatened by the effects generated by human presence, often uncontrolled, with devastating consequences: dispersion of solid waste, soil erosion, exploitation of the local population, pollution caused by the conveyances which generate, among other things, vibrations on the ground and on the monuments.

Already today the locality of Aguas Calientes, called Machu Picchu pueblo, which is a few minutes from the archaeological site of Machu Picchu is invaded by illegal building and tons of waste and polluting waste that are poured into the Urubamba River.

It is estimated that this destination is reached by 900,000 travelers annually [1] and it is feared that the high tourist flow could further damage the UNESCO heritage site. Machu Picchu already has a carrying capacity of 5,000 tourists a day, double the 2,500 visitors recommended by UNESCO.

3. Intervention proposal and objectives

The study conducted at the Department of Architecture of the University of Palermo [2] draws inspiration from these premises, aimed at identifying a travel alternative that can stimulate tourist interest towards lesser-known sites but equally rich in history, culture and art.

Attention was focused on the sites intercepted by the Qhapaq Ñan, or Royal Inca Trail, one of the greatest works of the Inca empire, the largest pre-Columbian domain in the Americas, which marked an era of great splendor until the arrival of the Spanish conquistadors.

Specifically, the goal is to create a tourist flow towards sites of particular historical and cultural interest intercepted by the Cusco-Desaguadero section and which currently have a low tourist turnout.

Objectives of the program are:

1. Decentralize the tourist flow towards other little-known locations;
2. Ensure the preservation and protection of the natural landscape and existing cultural heritage by making local communities aware of the defense of its territory;
3. Guarantee a future for the indigenous populations, proposing intervention solutions aimed at increasing the local economy by involving the communities as an active part.

The study began with an analysis of the infrastructures and sites of greatest interest in the area. An analysis was then carried out on the presence of tourists in some of the most interesting UNESCO heritage archaeological sites which are intercepted along the Cusco-Desaguadero stretch and which are compared with those of Machu Picchu, in order to establish which of these destinations are less known and visited.

3.1 Qhapaq Ñan

The Qhapaq Ñan is a complex administrative communication and transport system built over several centuries and largely based on the existing "pre-Inca" infrastructure.

The capillary road network guaranteed a rapid circulation of goods and information throughout the territory of the empire. The route originates in the center of the main square of Cusco and winds for over 30,000 km, branching out towards the four cardinal points and crossing 6 Latin American countries: Argentina, Bolivia,

Chile, Colombia, Ecuador and Peru. Qhapaq Ñan, declared a UNESCO World Heritage Site in 2014, is still surrounded by millenary traditions, stories and legends that constitute a precious cultural heritage. Of the entire road system, only a few sections and two particular places have been included among the protected sites. These include the Cusco-Desaguadero stretch and the Q'eshwachaka bridge.

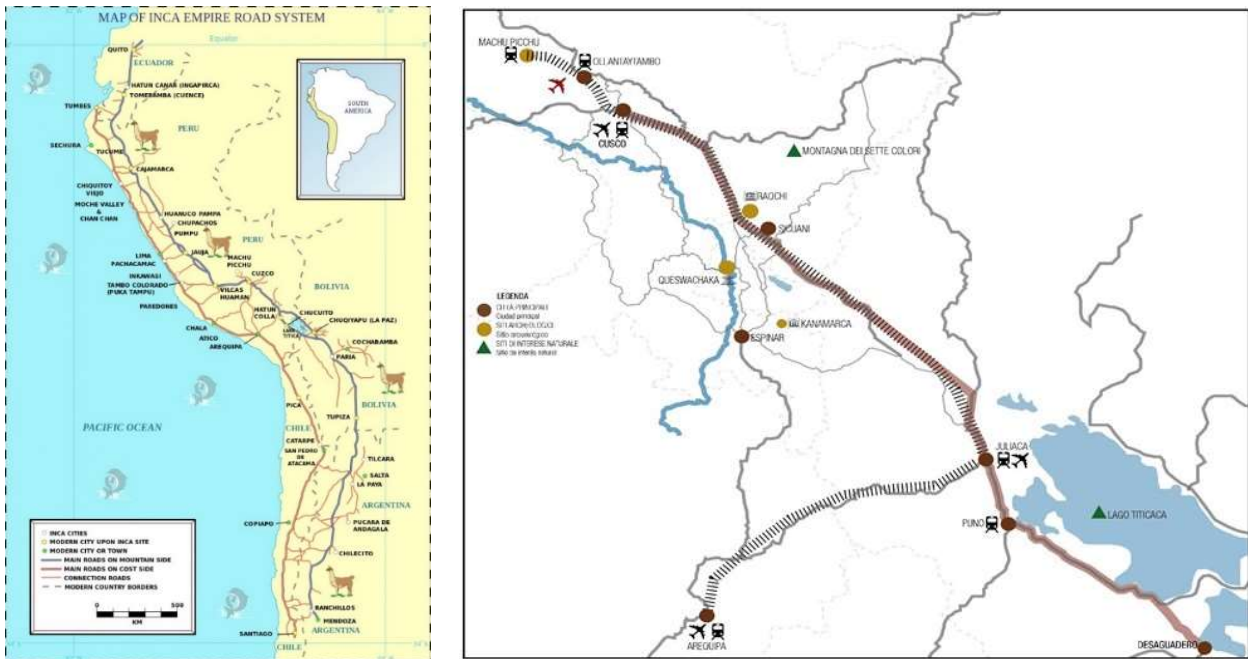


Fig. 1: Left, map of the Inca Road system. To the right, the Cusco-Desaguadero section.

3.2 Cusco-Desaguadero route

The Cusco- Desaguadero route extends between the city of Cusco and Desaguadero, a city bordering Bolivia. It connects two very important places of the Tawantinsuyo (the Inca empire): Cusco, the ancient Inca capital, and the Sun and Moon islands on Lake Titicaca, a place which in Andean mythology is considered as the origin of the Inca civilization.

Along this route you will come across sites of great landscape and historical-cultural value, declared a UNESCO heritage site. Despite this, this territory complains of a lack of tourist attention also due to the criticality of the infrastructural systems that make travel difficult, especially as one moves away from the city of Cusco.

Unfortunately, the lack of attention is also from the responsible administrations and although various state programs have been launched to guarantee the development of services in the entire section, little has yet been done.

3.3 Infrastructure analysis

The Cusco-Desaguadero route is currently served by two airports. Cusco airport and, to the south, Juliaca airport. A new airport is under construction near Chinchero, a town about 50 km from the entrance to the Sacred Valley of Machu Picchu and 20 km from the city of Cusco. The latter, while on the one hand it will strengthen the national and international tourist network, on the other it risks channeling the tourist flow towards a single destination, the sanctuary of Machu Picchu which is already undergoing enormous pressure due to mass tourism.

The railway line that crosses the entire route is in a precarious state. It consists of a single track and, near villages and towns, it crosses markets and passes near houses without any protective barriers. The trains are almost exclusively luxury trains used for the transit of tourists and with exclusive stops: Arequipa, Puno, Cusco, Ollantaytambo and Machu Picchu pueblo.

The state road, with two lanes, follows the railway line. It generally crosses towns, but sometimes it simply skirts them. The road has well paved stretches and stretches where transit becomes difficult; in these cases the road section looks like a "dirt track" often intercepted by small streams that make the passage problematic. The conveyances are insufficient. In addition to the luxury tourist trains, in perfect condition and with excessive costs, travel can be made with buses, taxis, shuttles and other alternative means called "moto moto" by the local population.

3.4 Sites of greatest interest and tourist flows

The places of greatest interest identified along the Cusco-Desaguadero route are: Mount Vinicunca, also known as "The Mountain of Seven Colors", the Raqchi archaeological site, the Q'eswachaka bridge, the Kanamarka archaeological site, the Titicaca.

From the general analysis of the data concerning the accesses to the archaeological sites intercepted by the Qhapaq Ñan path within the Peruvian territory, it appears that 57% of the tourists prefer Machu Picchu, 33% Ollantaytambo, 7% Lake Titicaca, 4% Raqchi and 1% the Q'eswachaka Bridge.

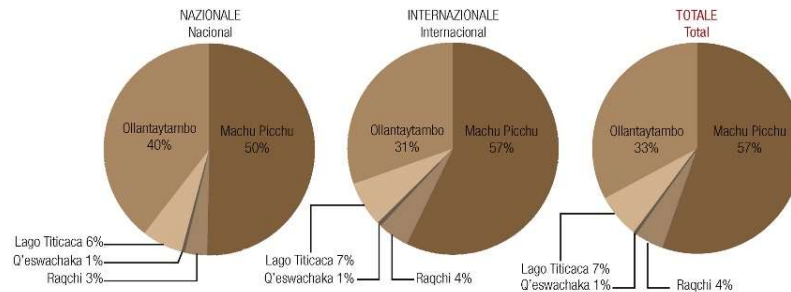


Fig. 2: Analysis of tourist flows.

4. Intervention area

From the above, it appears that the Q'eswachaka bridge is the least known and frequented destination and for this reason is the subject of this study.



Fig. 3: Q'eswachaka Bridge.

The Q'eswachaka bridge, named in 2014 as a UNESCO tangible and intangible world heritage site, is currently visited by just over 10,000 Peruvian and foreign tourists a year. It is an exceptional testimony of Inca engineering and the last of the suspension bridges that has survived to this day.

With a length of 28 meters and a width of 1.20 meters it is suspended about twenty meters above the level of the bed of the Apurímac River. It is located in the district of Quehue, in the province of Cañas in the department of Cusco, at 3,792 meters above sea level.

Made with ropes tied to the ends of the river banks, at a base built in stone and raw earth. The ropes constituted both the support structure of the walking surface for crossing the bridge, and the handrail. In the past, the Q'eswachaka was the only way to cross the river and therefore its state of conservation was absolutely essential.

Although today it does not play a role of fundamental importance, since there is an iron bridge that allows the river to be crossed, its annual renewal is a significant event. The work done by the communities on the days when the bridge is being built is called *mink'a* or *minga*, a term that defines an Andean form of unpaid collective work that has the benefit of the community as its objective.



Fig. 4: On the left, the walkway of the bridge. Right, a moment of the reconstruction.

The tourism development plans and programs implemented in the past by the government and the Cusco region for this site concern punctual interventions, aimed at improving the conditions of the site itself, leaving out actions aimed at improving the infrastructures.

The project proposal therefore includes the following interventions:

- identification and redevelopment of existing routes and infrastructures;
- design of rest areas along the pedestrian path, with reference to the ancient architectural pre-existence of the tambo Incas;
- design of an interpretation center near the Q'eswachaca bridge.

The elaboration of the project proposal was preceded by site visits which made it possible to carry out punctual analyzes of the natural and anthropic context and of the available resources, integrated by an analysis of the climatic data aimed at identifying the design strategies to be applied.

The protection of heritage is also expressed through the study and understanding of the traditional techniques of the Andean communities which have been re-proposed in a contemporary key, together with the application of appropriate technologies and bioclimatic strategies aimed at achieving comfort and energy efficiency of the plant.

4.1 Design criteria

The fundamental criteria followed in the design phases can be summarized as follows:

- attention to the forms of existing architecture and landscape;
- attention to socio-cultural and economic realities;
- respect for local identity;
- adoption of bioclimatic planning criteria;
- use of traditional local materials and techniques;
- adoption of strategies aimed at achieving comfort and energy efficiency
- easy maintainability;
- easy accessibility and connection between spaces;
- recovery and rainwater purification;
- obtaining of energy needs through the use of renewable energy sources;
- predisposition of careful waste management;
- use of low environmental impact systems for the treatment of waste water;
- reuse and/or recycling of all materials and components.

4.2 Climate analysis

The territory of Q'eswachaca is characterized by a cold and semi-humid climate, characteristic of areas with an altitude ranging from 3,000 to 4,000 meters above sea level, defined as "Mesoandine Valleys".

According to the temperature graph generated by the Climate Consulte 6.0 software, there is an average annual temperature of around 9°C, with average minimum values of 3°C and maximum values of 16°C. The

coldest months are June and July, where temperatures reach -3°C and the hottest ones are October, November and December where temperatures reach 17°C .

The rainiest months are January, February and March, with a maximum of 25 mm of precipitation per day. The predominant winds blow from the north-western quadrants, with an average speed of 12 m/s, and from the south-east with an average speed of 9 m/s.

The psychrometric diagram shows the total lack of comfort conditions throughout the year and indicates the design strategies that can be pursued to obtain indoor thermo-hygrometric comfort conditions. The considered strategies include in the present case: thermal mass, evaporative cooling, natural day and night ventilation, passive heating.

4.3 Identification and redevelopment of routes

Two types of routes have been identified that adapt to the needs of visitors:

Pedestrian path: Suitable for the practice of tracking, it develops between the slopes of the Andes enjoying a wonderful panorama. Along the way there are some of the oldest communities in the area. Travel time is seven hours.



Fig. 5: Pedestrian path to the Q'eswachaka Bridge.

Driveway path: The driveway is difficult to pass due to the condition of the road section. The estimated travel time is one hour.



Fig. 6: Driveway path.

The arrangement of the road sections that are in poor condition is envisaged, in order to improve their practicability and the design of indicative signs that identify the two different practicable routes.

4.4 Parking area design

The design of rest areas for those who undertake the tracking route is envisaged, equipped with the characteristic tambos placed at a distance of five kilometers from each other, equal to about an hour and a half of walking.

The tambo, from the Quechua tanpu, "temporary accommodation", was a receptive structure used to accommodate travelers and groups of state officials and as a warehouse for food and wood reserves. Located near the roads that made up the Inca Road system, they were built at a distance of about 20 km from each other (one day's walk) and their management and maintenance was entrusted to neighboring communities.

The intervention involves the recovery of the tambos intercepted along the way and, where necessary, the construction out of new structures.



Fig. 7: Tambo ruins along the walkway and tambo construction schemes.

5. Interpretation Center

The project proposal involves the construction of an interpretation center aimed at enhancing the UNESCO heritage site and at the same time preserving the identity and ancestral traditions of neighboring peoples. The "heritage" interpretation centers are structures conceived for the enhancement of the cultural and/or natural heritage of a given place or geographical area.

The goal is to facilitate the understanding of cultural and natural values, through awareness-raising and education that considers heritage as a reference. Inside there are laboratory activities, exhibitions, seminars and conferences, refreshments, souvenir sales. The construction of lodgings for scholars and researchers is foreseen.

5.1 Project area and Settlement principle

The project is inserted northwest of the Q'eswachaka bridge from which it is about 300m away. The position allows you to enjoy the view of the site without compromising the peculiar landscape characteristic of the place. The settlement complex is located at an altitude of 3,629 meters above sea level. and about 27 meters above the banks of the Apurimac River.



Fig. 8: On the left, project site. Right, settlement principle. Graphic elaboration by Simona Timpa.

The interpretation center can be reached via a driveway obtained from the fork in the main road and designed exclusively for use of the center. A pedestrian path is obtained from the extension of the pedestrian path designed in 2017 for the Q'eswachaka bridge.

The design proposal refers to some of the most important concepts of the Inca culture and proposes a traditional architectural typology. Among these emerge: the chacana, the tambo, the structural modularity, Inca shapes and configurations. The settlement develops along an axis obtained from the rotation of the chacana or Inca cross which depicts the Andean cosmovision and which is repropose in the pavement of the square.



Fig. 9: The chacana at the base of Inca architecture. Graphic elaboration by Simona Timpa.

The buildings are arranged symmetrically along this axis, which is perpendicular to the route of the Qhapaq Ñan and which is characterized by a flight of steps that longitudinally crosses the complex connecting all the elevations of the settlement. The entire complex is divided into two areas: a public area and a private area. The first consists of 3 buildings: one intended for laboratory and research activities, one as a refreshment area, the third, at a lower level, spread over two buildings that house exhibition halls and multifunctional rooms.



Fig. 10: On the left, laboratories and refreshment area. To the right, exhibition halls and multifunctional rooms. Graphic elaboration by Simona Timpa.

In the second area, at a higher level than the other buildings, there are the residences intended for the workers of the interpretation center and for the scholars. It is a complex of six autonomous residences on two levels, arranged along the steps, interrupted by a small panoramic square, according to the settlement principle of the ancient Inca cities.



Fig. 11: Left, residences. To the right, refreshment area. Graphic elaboration by Simona Timpa.

All the buildings designed maintain the typical shapes and proportions of the Inca tambo and recall traditional construction techniques.

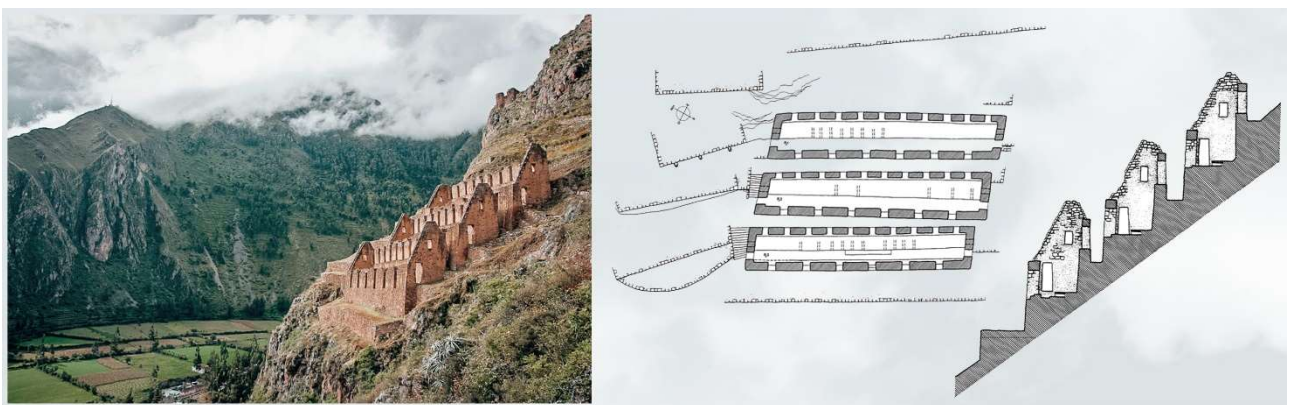


Fig. 12: Inca settlement of the city of Ollantaytambo.

The entire structure is built with eco-sustainable materials mainly available locally, such as earth, straw, wood and q'oya, and construction technologies applied in compliance with current Peruvian legislation [3]. Rainwater recovery and purification systems are planned, as well as an energy supply system using river water through a bypass channel which diverts part of the water flow, conveying it to a turbine and then returning it to its original route. This ensures minimal impact on the surrounding environment.

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