



Socio-Economic Sustainability in Vernacular Architecture

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(photo: Kays Djilali © Ministère de la Culture, Algérie, 2011).

Vernacular architecture is a wide area of study, with singular researches and complementary studies. According to the *Encyclopedia of Vernacular Architecture of the World*, it comprises all dwellings and buildings, either private or community-owned, which were built using traditional technologies (Oliver, 1997). This can reveal how vernacular architecture is an unlimited source of conceptual solutions, through which sustainability can be rediscovered. In vernacular architecture today, there are still examples that can be observed where there is a balance between energy saving, tradition, the environment, and the social parameter. This is particularly observed in rural and isolated areas. It is not the case in urban areas, where the pressure of fast growth, both of the population and of its habitat, undermines any possibility of a balanced approach.

When addressing the revision of literature regarding sustainability and its impact on vernacular architecture, it is observed how there is a persistent tendency to privilege the study of environment issues, in detriment of the social, cultural and economic parameters. This is reasonable regarding a first observation of vernacular architecture, since environmental issues tend to be physically evident, and therefore easily observed. Thus, Vellinga (2015) underlines the fact that restricting the focus to environmental issues will not only show a partial picture of the challenges faced by vernacular architecture, but also offer a partial understanding of the lessons that can emerge from its study.

It is therefore essential to approach socio-economic sustainability as a broad area of study with different dimensions. In this article, the dimensions under analysis will relate to the identification of socio-economical principles; to the economy: its needs and values; to collective values being economical values; to the efficient management of local resources; to a self-management economy; to the impact of the economic factor on local development; to assessing the economic value of vernacular architecture; to the impact of conservation in economic terms; to the conservation of traditional architecture; and other relevant reflexions.

Socio-economical principles

To value with relevant significance are the socio-economical principles, which empower the community to optimise their local resources, contributing towards the development of effective strategies for

sustainable development. This is possible to achieve by supporting local communities to be more self-sufficient, by sustaining local production, by optimising local materials and by choosing to work with communal efforts. Furthermore, community development is valued when evidence is considered, regarding the fact that the extension of the life span of a building and of its parts has a direct impact on the local economy. Maintenance, conservation and adaptability of the dwellings can be reached through balanced efforts, directed towards a more inclusive and integrated approach. Additionally, preventing the waste of local resources can contribute towards a more steady and efficient sharing of resources, energy, the environment, infrastructures, systems, and communal life.

Economy: needs and values

Economy is very closely bound to the use of resources and the more modest the use, the closer it is to the economic function (fig. 1). In Mali, several settlements have cereal storage granaries (*'greniers'*) built for the conservation of the cereal. The number of granaries and their building culture varies according to the cultural zone. Their number can also increase, if there is an abundant harvest (fig. 2). In general, each family builds their own individual granary. However, during periods of drought, communal granaries are built for food security. In modest communities, families try to do the most with the least possible resources. Economics is therefore, according to Ost (2010), a way to satisfy the needs, by managing scarcity and non-renewable resources.

Fig. 1 Modest constructions between Segou and Mopti, in Mali (photo: M. Correia).





Fig. 2 Granaries between Segou and Mopti, in Mali.

Fig. 3 Qanats in the cultural landscape of Bam, in Iran.

Fig. 4 Khetaras in the Oasis of Figuig, Eastern Morocco.

Fig. 5 Foggaras from the Ksar Ouled Said, near Timimoun, in Algeria.

(photos: M. Correia)

However, Juvanec (2009) adds that the economic parameter can be wider, as it can involve the sum of the material availability, the technical circumstances, the possibilities and abilities of the builders, as well as the needs of the family. Also to consider are the values of the community, associated with their culture and beliefs.

It is these needs and values that were reinforced by Oliver (1987), when he mentioned that all forms of vernacular architecture are built to meet specific needs, accommodating the values, the economy and the ways of life of the cultures that produce them. Also stressing the importance of values, Zupančič (2013) underlines the fact that the economy in vernacular architecture relates to the identification of living environmental values, through the function of spatial structures in vernacular architecture. Therefore, the analysis of the values and the concern for the needs have a decisive contribution on the study of vernacular architecture economy. It is also essential to understand how economic issues have been understood and undertaken by local communities.

Efficient management of local resources

Isolated communities spend energy and resources looking for a more efficient management. This can be observed by the use of communal ways to develop more efficient use of resources. For instance, through the opening of water floodgates to periodically clean the village paths, as in Vilarinho da Furna, in Portugal (Calado, 1999); or by using the water cycle efficiently: through a resourceful flow of water, which continuously passes by drinking fountains, runs to water mills, then to water for animals, through washing tanks, and finally to be used on the crop fields. This is common usage in different rural parts of the world, especially in mountainous regions in the Iberian Peninsula. Important to mention, in socio-economic terms, and still in use nowadays, is the existence of rotation practices, among several communities, regarding the efficient management of local resources. This can be observed for instance with the sharing of the water in desert regions, which has an important role in the survival of populations in hard climates. The hydraulic system is composed by underground tunnels created by man for the passage and management of subterranean water. These tunnels have a slight slope with the water flowing by gravity from below the water table, in general located near mountains. The water is transported through the de-

	11		12		13		14		15
to support autonomy		to promote local activities		to optimise construction efforts		to extend building's lifetime		to save resources	

SOCIO-ECONOMIC PRINCIPLES *The habitat empowers communities and optimizes local resources.*

sert, for hundreds of kilometres until it reaches the soil surface, creating oases, where populations settle. On the surface, the community shares the water in a very efficient way. The water is supplied as drinking water and for irrigation in agriculture. The system is known as *qanat* in Iran (fig. 3), *falaj* in the United Arab Emirates, *khettara* in Morocco (fig. 4), or *foggara* in Algeria (fig. 5).

Collective values are economical values

In several regions of the world, traditional homesteads are organised in sustainable economic systems which avoid waste and save energy, through an efficient management of resources, including people, land, animals, equipment, outbuildings, main house, materials, resources, etc. These sustainable systems are even applied by several communities, which work together to produce, distribute, and consume wealth. They aim to create a restrained and efficient use of available materials, techniques, goods, food, etc., and to share resources to help the community. Doing so local people also obtain benefits for themselves. Therefore, these collective values can be considered economic values, and according to Ost (2010) cannot be attributed to any individual.

Worthy of mention is the community self-help present in different moments of the daily life, as is the case of the communal construction of rural facilities for common use. For instance, in the North of Portugal and the Northeast of Spain there are communal facilities in several villages; this includes communal threshing floors – where the straw and seed are separated, corn cribs – for the storing of corn cobs, or communal ovens where the fire was traditionally kept burning day and night, in order to cook bread for all the community and provide as well, a source of warmth for the poorest.

In traditional villages, it is still a reality that local populations unite for collective purposes and to build their spaces of work. Communal efforts create spaces to produce materials needed by families to trade or sell, contributing to the survival of local economies. Traditional tanneries are a fine example and can be observed in several Medinas, as is the case of the Medina of Fez (fig. 6) and the Medina of Tetouan (fig. 7), in Morocco. The leather resulting from the skin of animals such as lamb, ox, camel or goat is cleaned and coloured with natural dyes. The animal skin is immersed in vats filled with lime and dove excrement, where they remain for days to get clean. The acid mixture removes flesh and hair from the skin and makes the leath-

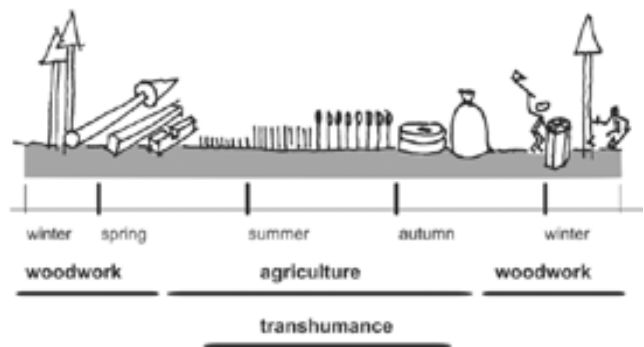
Fig. 6 Traditional tannery in the el-Bali, Medina of Fez, in Morocco (photo: A. Lima).



Fig. 7 Traditional tannery in the Dar Dbagh, Medina of Tetouan, in Morocco (photo: A. Lima).



Fig. 8 Cycle of the woodwork: in the mountains of Slovenia, peasants work throughout the whole year, as agriculture runs from the middle of spring to the middle of the autumn. Colder seasons provide work in the forests (drawing: B. Juvanec).



er more malleable and smooth. Then, the tanners pass the knife to trim the fur and reintroduce the skins in vats to traditionally colour them. The skins are then set to dry on the numerous terraces and roofs that surround the tanneries. Once dried, the artisans create with the produced leather bags, shoes, clothes and accessories. In the medina, the different shops, where the manufactured products are sold are located near the entrances of buildings, with direct accesses to the terraces, where the tanners (*debbaguim*) and the dyers (*sebbaguim*) can be observed working. The complex has a plumbing system that usually is connected to natural water sources that clean the vats. The collective values associated to the common effort developed by the community to build the tanneries and to produce and colour the leather products, resulted in a self-sufficient economy for the common survival of the whole community. As mentioned by Oliver (1987), the advantage of exchange, trade and even barter, offers the opportunity to produce, to sell and to purchase, which are incentives to use the village and, for many, to be a part of it. This approach creates sustainable economies capable of being more self-sufficient.

Self-management economy

In the mountains, in several European countries, communities were integrated in a context characterized by strict geographical and topographical features. There were, and in some places there still are, isolated communities that autonomously implement a self-management economy. Subsistence was barely possible through simple economic activities, such as agriculture and livestock. Both concepts were based on different ways of using the territory by identifying its values and characteristics, and thereby leading to the creation of different housing clusters, adapted to a mild summer climate and to demanding winters, in response to the needs of economic exploitation (Gomes, 2014). This argument was previously revealed by Oliver (1987), when emphasising that the economics of settlements relate to time-distance factors, which affect the ability of a population to work its lands.

This issue also relates directly, to the economy and the livelihood in the settlement, as with the occupation of the territory. The village of *Strojna na Koroskem*, in Slovenia, addresses this matter. The village is located in the Alpine region of narrow valleys with livestock

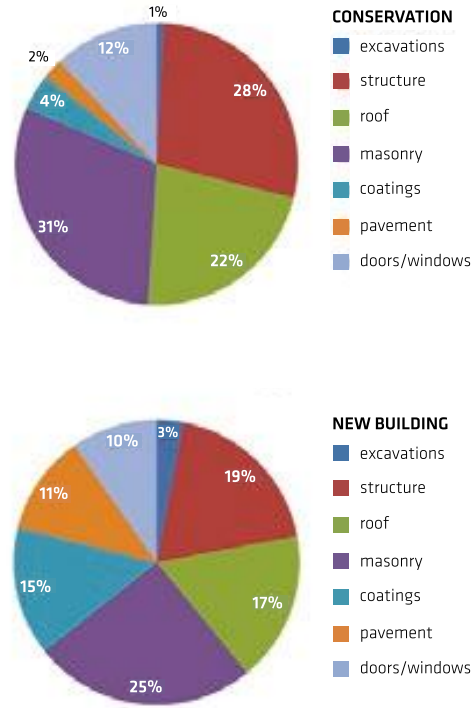
pens. In the past, the region was inaccessible for a good part of the year, due to the snow. The farm buildings comprised a dwelling, with residences for the owners and sometimes for the workers too, as well as the rural equipment and auxiliary structures needed for life and production. The main residential dwelling could be attached to the working part, or could be autonomous. Required for the development of the farm economy, the outbuildings were composed by stables, animal barn and other auxiliary buildings. The animal barn required more attention; therefore it was located near the dwelling; while the other structures could be distant from the main house. The farm was totally functional (Juvanec, 2009).

Economically speaking, the farmstead is a rural economic unit based upon agricultural work, and livestock. The members of the family and other hired workers carry out the work. The farm community is technically and economically efficient, basing its self-economy in various principles: mainly the possibility of managing the work beforehand, which allows having the work spread-out throughout the year for all the workers involved, and therefore providing not only regular work, but also self-subsistence at home (fig. 8).

The impact of economic factors on local development

The current abandonment of several vernacular structures leads to the need to define a conservation and enhancement strategy for rural heritage, through sustained intervention, considering that natural and cultural resources are based on economic and social reorganisation. According to Barão, Valente and Reimão Costa (2014), any conservation strategy and promotion of cultural heritage in rural areas, corresponds to a deliberate intention to safeguard cultural natural resources for the future. This would be possible through sustainable development which would ensure an ecological balance, in terms of management related to the economic, social and functional reorganisation of cultural heritage, at different levels.

Fig. 9 Economic value assessment table of vernacular architecture conservation versus new building, in Rincón de Ademuz, Valencia, Spain (credits: F. Vegas, C. Mileto).



Several authors also argue that a deeper study of economic factors could have a relevant impact on local development, as a key issue to give significance to the local community and its protection. According to Fernandes and Mateus (2012), research, professional training in traditional techniques, conservation actions or adaptation of existing vernacular heritage could also contribute to boost local economies. The spread and success of these actions could even promote the revival of small industries of traditional local materials, reducing energy needs in the production and transportation of building materials. This could definitely have a positive impact on local development.

Assessing the economic value of vernacular architecture

Some authors, such as Giannakopoulou and Kaliampakos (2014), support the idea that vernacular architecture itself holds the key for the development of vernacular heritage in isolated regions (i.e. in mountainous regions). The only way to assure that maintenance and conservation is cheaper than new building is to reveal the potential benefits of vernacular architecture in monetary terms. According to Giannakopoulou et al. (2011), 'several authors (such as Collier and Harrison, 1995; Bateman and Willis, 1996; Carson, 2004) already applied this cost evaluation through a well-known and widely stated preference technique, the *Contingent Valuation Method*. The preliminary findings indicate that vernacular architecture holds a significant value, which could justify its protection. However, regarding this matter, more quantitative analyses should be undertaken, comparing different regions and criteria of intervention.

Impact of conservation in economic terms

As a result of the workshop dedicated to *Heritage Economics and Conservation Funding* organised in Syria, Ost emphasised that conservation is "an economic process of allocating resources today, in order to maintain and/or obtain higher economic values tomorrow" (2010, p.90). This is generally accepted when referring to monumental architecture and world heritage sites, due to the impact of tourism. The uncertainty arises from the conservation of traditional architecture. The fact is that conservation of traditional architecture may also prove to be a powerful motor for economic development and the promotion of handicrafts, building trades and small industry in rural areas.

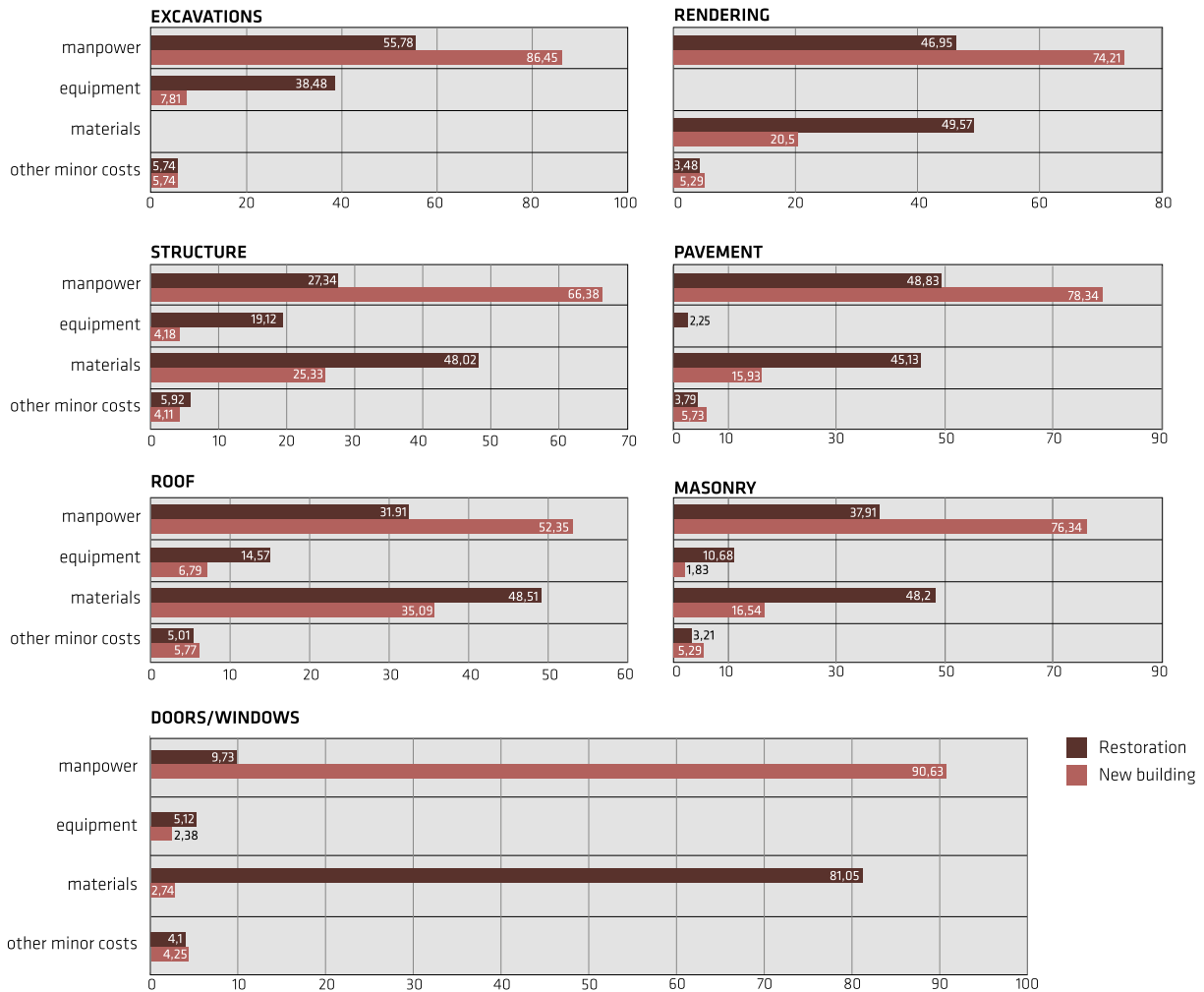
Economic assessments developed in Rincón de Ademuz, in Valencia, Spain (Mileto and Vegas, 2005), demonstrated that the conservation cost of existing buildings did not exceed the cost of erecting new structures. The comparative analysis began with the rehabilitation of a single building and was subsequently extended to twenty buildings in the region. In all, costs and performance of conservation were studied, both in project and on site construction (fig. 9).

The study demonstrated that the conservation cost of an existing building did not exceed the cost of erecting a new structure. This was possible, as the overall aim was to stop the demolition and the substitution of the traditional houses that constitute the vernacular built heritage by new houses that increasingly alter the built landscape, eliminating its value, content and identity. Therefore, conservation practice was complete on twenty vernacular buildings, in a poor state of conservation. The performance of every project was measured and the cost of all units was estimated. The partial costs of recovering each element of the building were compared with the equivalent replacement costs that would entail its new construction, in the case of demolition, and substitution by a newly built house. Furthermore, this study also demonstrated that conserving and reusing an existent building requires much more local handicrafts than

COMPONENTS	NEW BUILDING / CONSERVATION COSTS VERNACULAR ARCHITECTURE
Excavations	333, 33%
Structure	-14, 74%
Roof	-1, 35%
Masonry	7, 92%
Renderings	350, 00%
Pavement	531, 58%
Doors/Windows	5, 00%



Fig. 10-11 Costs comparison of vernacular architecture conservation versus new building, in Rincón de Ademuz, Valencia, Spain (credits: F. Vegas, C. Mileto).



■ Restoration
■ New building



Fig. 12 Communitarian maintenance of vernacular buildings in Romania (photo: M. Correia).

erecting a new structure, thus promoting the survival of traditional building trades, generating labor demand on site and benefitting local economy (fig. 10, 11).

Conservation and partial or total rehabilitation of the built heritage represents a sensible and sustainable attitude (Doglioni, 2008), as it allows the existing resources to be reused.

Careful rehabilitation of this rural heritage consumes much less resources and energy, and generates less carbon dioxide during the construction. This not only provides savings in the transport of demolition debris, but also proves to be less expensive in the delivery of the materials for new building, and avoids the use of large equipment during construction. The use of traditional techniques and local materials in the conservation of vernacular architecture is the result of the advantageous use of means and resources available in the vicinity with nearly no transformation. This also allows important savings that help decrease the pollution of the environment.

Conservation of traditional architecture

Conservation of traditional architecture, independent of its absolute cost has in general terms, a very positive influence on the development of the local economy, as it generates labour demand, and preserves the building handicrafts and trades. It also allows the safeguarding of the cultural identity of traditional architecture in rural settlements, which constitutes an attraction for cultural tourism and encourages the development of the local economy. The fact that many international institutions recognise the importance of vernacular heritage conservation supports the relevancy of this legacy, in terms both of economy and identity (MEDA-CORPUS, 2011). The conservation of traditional architecture is an excellent field to redirect community-oriented economic activities.

Conclusions

The traditional production system ensures the management of tangible and intangible assets, confirming the sustainability of the method, under the basic rule of closing cycles and with the restriction of a pattern that governs it: the economy.

The steps to achieve this balance have to be the essential ones, which are possible through minimum effort, reduced movement, efficient work, effective management of the available resources, and collaborative efforts to ensure maintenance over time (fig. 12). However, the re-adoption of these ways to operate and to face the challenges presented by sustainability is not as self-evident, as it may seem at a first approach. With the introduction of modernity, major differences appeared within traditional models. Nowadays, the challenge brought by contemporary society is to regulate traditional ways of life and to justify, both in economic and energy-efficiency terms, the importance for the need of conserving vernacular settlements and structures.

The rapid transformation of the world is having a great impact on the socio-economics of vernacular architecture, which is also changing with great speed. The response could emerge from the regeneration of rural areas in regions that are under change and the preservation of vernacular ways of life in original habitats. As mentioned by Oliver (2006), the discourse on sustainability is too city-oriented. The implementation of decentralized policies in rural economies could contribute to the regeneration of these rural areas, a relevant and needed approach. The conservation and redevelopment of these areas could be a way to discontinue the expansion of cities and to contribute to the preservation of balanced habitats that are still alive nowadays and that support the diversity and the quality of life in this world.