From built environment to built stock.
The affection of socio-cultural influences

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Abstract
This research presents an approach for determining factors related with the understanding and decision making over local built environments to understand the evolution of its built stocks. The investigation takes part on an interdisciplinary approach, theoretical and analytical, over the study of a specific built heritage. At a first sight, the first methods of surveying in central Europe are related with this case study of some buildings located in particular environments; built under concrete local traditions and specific time on the history of Västra Götaland region in Sweden at the end of the 19th Century.

The approach goes throw understanding long-term policies starting on its history, by previous written literature, and subsequently, with a detailed analysis of the so-called bequest values, tangible and intangible, that allows us to relate the case study with theories of built stock management. On a later reflection, the concept of Socio-cultural Life Cycle will create links under a common sphere between what a humanist want express with the term built environment and what a technician or engineer want express under built stock terms, trying to create a common understanding towards the occupancy, maintenance, optimization and appearance of built places.

1. Introduction
The aim of this research is to relate recent publications involving the intangible values of built stocks with a detailed analysis of the socio-cultural affections on built environments towards a better quantification of its stock. For this, an interpretivist example, as a case study, will be the object of this research, at least in a first instance. The research is proposed because the necessity of connecting the context of built stock and the relatively narrow understanding with the ‘social’ values; limitations that are linked with the lack of integrated higher education programs in this specific area (Johansson, 2008).

Probably, also it happens because is quite complicated to find a common space for publishing this kind of interdisciplinary interpretations under the same high-impact umbrella. Despite the space recently provided to construction researchers, the most of the research is based more on analytical than theoretical analysis. Recently it has said that the ability of construction research depends on a better articulation of theory and empirical research, in particular in researching non-technical dimensions for more integrated whole-life or whole-system approaches (Schweber, Leiringer, 2012).

Currently has been said that construction researchers have to engage on a explicit dialogue between theory and empirical work, and thus, this research comes to demonstrate that built environments or stocks, independently of the particular perspective, connotations or influences coming from the specific field of each reader, must be understood as a multidisciplinary and overstep approach towards a better comprehension. The dominancy of economic and eco-efficiency fields on building management have established a specific way of thinking, tools and protocols. This fact creates methodological problems, and raises issues entailing quality criteria in research (Kohler et al, 2009).

In this sense, a multidisciplinary approach gives us – researchers who are more theoretical than analytical- the reason to crave for a small space putting the spot that remains in analytical interpretations. This is the reason to tackle the socio-cultural spot inside building research. Without it, it will be quite difficult or even impossible to deliver any assessment or management related with the knowledge of its inhabitants. In this way, this research has attempted to break the boundaries between previous slanted insights looking at a common space through different magnifying glasses.
This particular case study of survey shows that long term composition and dynamics of the built stock could be currently approached from different perspectives and different methods. An opened point of view, not only based on the building, also based on the evolution of the landscape and its society, can help us to understand long term changes and challenges as a complex decision making involving biological and environmental metamorphosis. This particular approach can help us to recognize that the long-term behaviour of the stock is more significant than new construction, and the issue of maintenance should be understood as a relevant matter.

This study does not pretend to serve as an example of reliable statistical data to other built stocks. The first part of the research shows a fieldwork survey based on around eighty-five detached buildings built on specific purpose on the late 19th Century. The relevance of the survey rests on an exhaustive field work with a final multidisciplinary gaze to put this built environment into the context of a current built stock.

The main aim of the research is, when the reader has finished to read it, to offer a comprehensive understanding due to the structural complexity of the built stock, not just based on its rates (because they are affected by specific connotations that cannot be extrapolated to other realities), also based on a different view, the socio-cultural implications and its affections over the built stock. Thus, this socio-cultural proposal is based in interrelations between economic, physical, social and cultural aspects through the following issues: historical buildings; management; life cycle; product modelling; time; infrastructure; and land-use (Kohler, Hassler, 2012)

2. Survey and Assessment. A chronological approach
It can be said that Historical building research, disengaged from the study of monuments and historical sites per se, and more as a matter of ethnography or even geography, focused on building classification from those buildings which were linked on specific traditions, works, environments or landscapes and, also under certain values of local people’s sensitivity, perception and sense of belonging were developed as a first instance in central Europe. The first systematic classification of this kind of historical building research was an approach from those which were interested in architectural historical research.

In Switzerland, in 1944 was constituted, by members of SIA, BSA, Heimatschutz, and other national boards linked with monuments and the local development, the Die Bauernhausforschung with Alfredo Baeschlin as chief architect. The approach towards the Swiss vernacular heritage was focused mainly on material and geographical features of buildings, its environment were considered the principal source of information to understand its composition and evolution. The investigation was documented by means of draws, photos, images and extensive descriptions with the interpretation of textual and contextual sources (Baeschlin et al, 1948). This pseudo-ethnographic approach was extended to the whole country; all cantons were visited by many volunteers coming from universities, trade schools and, over all, supported by many neighbours and local intellectuals.

Later studies have been developed all around Europe but just in a few cases with a systematic collecting data over thousands of buildings (Rentzhog, 1984). These studies have been carried out by some local or regional associations focusing their interest mainly in the history of the building and its later transformations; how it was designed, built, repaired or restored. The resulting knowledge mainly serves as a basis for conservation measures on local or regional environments. Furthermore, in the last decades, some of these studies have focused their interest on a kind of building or groups of buildings classification have been focused on places were traditional built environments presented serious transformations and a sudden metamorphosis of the historical environments that surrounded them (García Esparza, 2010) (Fig. 1).
Figure 1 explains the procedure employed to analyze this particular environments and the buildings remaining there. By means of digital cartography, the procedure started having screen shots over small strokes of the railways still recognizable with aerial photography. The work ended with the assembly of all the screen shots and composing the whole railway. Turning the composition, it is possible to check the similarity between today's outline and the historical map.
Deepest and punctual studies have been developed on the preservation of specific buildings which remain in remote environments as a testimony of specific economic activities that no longer exist and even cannot be linked with the landscape because its transformation (García Esparza, 2012b). All these later studies have been developed with the help of its contemporary technology; digital media and specific surveying tools that have allowed new ways of representations sharing texts, drawings and images in the same computational space.

The current research analyzes specific buildings and landscapes as fragments of regional infrastructures in which development, the technological and economical, forced it to being detached from its original porpoise and specific functions. Terms of economy, management and stock, are directly related with the evolution of those environments. The most of the buildings have suffered important transformations and others have been abandoned. The inflexion point rests on the equilibrium between the historical legacy, its materiality, its representation and the necessary changes forced by time and development.

The current study is focused on the analysis of tens of buildings that remain on the historical and disappeared narrow gauge railways of Västrä Götaland region, southern Sweden. Collecting data was developed as traditional way, by an extensive field work around the environments in which buildings are located. Taking some notes, photos and measurements, all the information was collected and processed by digital cartography (www.hitta.se and www.eniro.se) and other media sources with specific surveying tools as CAD and Photoshop.

The existence of GIS software or other database descriptions allows implementing field work with its geo-reference. It should be said that classical ways of classification and archive must be focused on the development of these tools which also allows the user to understand process of transformation of built places. But this is just possible with the existence of robust diagnosis and monitoring devices and, with professional structures that can provide a complete survey, not experienced yet in the present case study.

Currently, theses tools are being used to model built environments to understand it as places with or without potential on its management and its energy demands (Thuvander, 2002). The relevance of these geo-referenced tools are used and analyzed by engineers and economist to understand what is happening in traditional environments in relation with population flows and stocks. This has allowed engaging local research with international, national or regional construction activity statistics (Kohler et al, 2009).

3. Built environment case study; history

3.1. The railway

Throughout this Century intense efforts were made to improve communication conditions in Sweden. When the railroads emerged in the 1850 as a genuine alternative to the channel and other waterway projects, there was a heated discussion about the pros and cons of each communication (Bodstedt, 1945) (Fig. 2). Most parishes pronounce itself in favor of a railroads, and any they wanted to see this drawn through its own destination, but design responses was primarily depending on the parish's geographical location (Johansson, Mårtensson, 1979).The most of the through lanes was built around 1850 when took place the strongest development of this mean of transport.

On new planned paths were transported not only iron or ore, also wood and other goods for third actions around lakes, mines and villages. The narrow gauge railways came to give a great impact on the country's industrial and rural developments. At the beginning of the 20th Century, narrow gauge railways were also being built as an specific forest paths, with 600 mm gauge, in conjunction with extensive deforestation in some areas of Västrå Götaland (Freding, 1979).
Figure 2 refers to the current disappeared narrow gauge railways. Its construction started on 1867 with the first one which connected Herrljunga, an important stopping point from the main line in the centre of the region, with an important coastal city called Uddevalla. This line was completely transformed for subsequent contemporary traffic. Because of this reason this line was discarded from the research. The second narrow gauge railway built in the area was that which connected on November 13, 1873 Lidlöping and Hjo. These villages, located in the banks of the biggest lakes of the region were connected by a railway of 891 mm gauge, and by two railway companies, Lidlöping-Stenstorp (LSSJ) and Hjo-Stenstorp (HSJ). On July 31, 1985 the third narrow gauge railway—891 mm-connected Uddevalla with Lelängens (ULB) and the fourth one with the same gauge was the Västergötland-Götaland railway opened for the public service on January 1, 1900. All narrow gauge railways were nationalized on July 1, 1948, because complications in their economical situations. Along the 60's all narrow gauge railways were closing and lately dismantled (Pettersson, 1999).
The railways birth also helped farmers on the development of their settlements with schools and other services not existent before. For agriculture this was solely for the benefit, and then population undivided could engage in farm management. With the growing of new settlements these lines also were in charge of carrying construction materials; from lake plants to roof till lime from some industries. In this sense, the development of industry in the province was specifically supported by private companies that look for international commerce (Forsæus, 1985).

These railways were a matter of individual enterprises which after examination could possibly receive state subsidies. Minor branch lines were being development as “minor railroads” to connect other isolated areas. The important thing was to connect these remote places at any earthen or other fluvial mainline to connect domestic traffic points (Linde, 1989). In 1862 the entire Western Main Line State Railway was opened to the public connecting Göteborg with Stockholm. From this date the region started its secondary and third railway lines looking for its development.

3.2. The architecture of the railway
In Sweden, many buildings in the countryside, as the stations for the narrow gauge railways, were influenced by publications of the architect Adolf Edelsvärd and the farmer’s builder Charles Emil Löfvenskjölds (Linn, 1986), where they spread models characterized by patterns of "neatness and ease"; looking for last forever the dirt and the darkness, being removed by new and healthy buildings (Lange, 1995). They watched every construction detail as an important task of design and form, thus they wanted to spread the knowledge for the people’s understanding towards to tasteful buildings (Löfvenskjölds, 1990).

Architects and other professionals wanted to adapt buildings to the surrounding nature (Wetterberg, 2012). Influenced by contemporary English novel, they may also were attracted by the emerging picturesque villa style. Also, naturalness, efficiency and material truth were thus three features of influences coming from Swiss style (Linde, 1986). They believed that the style were the best suited for rural environments because it could create "harmony between nature and art. Free as nature is that style". "National character” appears evident in the average rural station (Linn, 1986).

Another Swedish architect, Anders Arvid Ståbi, tried to combine modern technology, new materials and rational forms of production with a tradition and custom expressions. Thus, in the 19th Century, popular construction started to be innovated. This was the beginning from academic understanding towards a really beautiful Swedish rural architecture would look like in order to achieve knowledge of the good folk architecture (Lange, 1992). All of them shaped houses, made within a specific time and under special circumstances in the way to contribute on a visual ability to distinguish local particularities (Fig. 3-4).

The most of the environments that the Swedish railway architects portrayed was small and located in the backwoods. The architect understood the station as a central hub that governed the placement of other commercial buildings, cargo warehouses, water towers, pump housings, engine shed, coke sheds, latrines, official residences, stores, cellars and sometimes a hotel and restaurant. Architects wanted to vary railway architecture and portray it in harmony with the site conditions. Swedish building culture and the early land stations had much in common with older houses in the Swedish countryside. Many smaller stations came under the guidance of trained local builders.

Later, the machinery to cut timber and even new materials led the construction technology to be gradually changed. Industrialization and internationalization influenced in the technical transformations of the stations in Sweden. This influences converted foreign patterns under the
Figures 3 and 4 show different models found on the three studied railways. From models retreating analytical functional thinking developed in the mid 19th Century in Sweden (Linn, 1986) (see models from the first line studied on table 1), to the influences of the English novel and Swiss-cottage (see models from the second line studied on table 3) till the influences of contemporary Nordic style (see models from the third line studied on table 2). A specific aesthetic care and awareness was achieved in each model. The style was also maintained in other buildings which finally would compund each urbanized stopping place. Other significant buildings, outside these places, were guard cabins built on average every 3 kilometres of railway. Ban-guard cabins were one of many building types necessary when railways were planned and built. Specifically, those buildings were built detached from urban places, just for controlling rural junctions and the maintenance of its correspondent railway stretch.

In relation with the guard cabins found along these railways, typology 5b is considered by Axelsson (2008) the first model of guard cabin (SJ 1855-1872). Typology 5a is considered by Axelsson another model of guard cabin (SJ 1872-1892). Typology 4b can be understood as another model of guard cabin (SJ 1892-1897) and typology 4a is the result of several transformations occurred on the last period (SJ 1910-1921).

Practically, as a norm, all the stations belonging to cities located at the beginning or at the end of each railway were transformed, demolished or re-built with other materials to develop other purposes. This was the case of Lidköping, Hjo and Tidaholm on the first railway. The same happened with Udevalla and Bengtörs on the second and with Göteborg and Vara on the third.
Swedish conditions or even under the local understanding. In the pioneering lines, and as a dominant criterion, creating a special identity for the railway stations do not seemed to be needed. The common features in many stations was the lengthy eaves on the track, the long line of large windows and doors, plans symmetrically constructed and facades made of wooden panels (Linde, 2010).

The appreciation of the nineteenth-century rural buildings by the later-day critics dismissed it as inappropriate. Pioneering the future delight in creating stations with ornate wooden decoration was soon to give way to the need for frugality, and thus, easy to care for and easy to build. Private railway companies gave academically trained architects commissioned to design stations: Adrian Peterson (1835 - 1912) projected characteristic wooden station buildings in 1897 for the narrow gauge railway through Västergötland-Göthenburg (Linde, 2010) and Eugen Thorburn (1860 - 1931) was a short time architect for the station buildings at Uddevalla-Lelångens (Forsæus, 1985).

From 1855 to 1895 it was revealed 41 known model house in the whole country. After them were built 210 stations, while 87 of they built station buildings were unique. Some deviations from the original model house were generally the rule, often due to differences in the local terrain conditions, material availability and “not least in consequence of experience, but maybe on improvements to produce greater efficiencies and savings”. Along the individual railways in Sweden their stations became a particular type of construction, almost without exceptions, and usually from the beginning (Linde, 1989).

3.3. Tangible and intangible values

3.3.1. Materials

Wooden buildings have existed in Sweden since the first settlements, but probably were in the Middle Ages when construction systems were improved with the knowledge of wooden properties and the use of new tools to improve joints and surfaces. In joint terms, its performance affected in a better stability of constructive systems and, in surfaces terms, allowed to give the timber a smooth finish towards a better cleaning avoiding accumulated dust and moisture (Andersson, Sjomar, 1984).

Wooden panel architecture is closely linked with access to forests and technology development in sawmills and woodworking. The oldest Swedish panel buildings date from the mid of the 18th Century. The innovations that changed the panel architecture were mainly the steam engine, the circular saw and the band saw. Nowadays, this whole manufacturing process is industrialized. Only in a few places, some carpenters work on designing and decorating wooden panels manually sawn (Almevik, 2004).

Panels were based on a hand-made production. All operations were based on sawing the entire length of the panel. The carpenter provided all panels cut in accordance with each façade dimensions or lately provided in standardized sizes. In the first stages of the technique, in the building place was planned the location of each panel and the eventual shape of its edges. The lines were done with a thread coloured with chalk, ash or red paint.

To get the most out of the panel it could be allowed that the top of the panel ended a little bit wane. However, it was needed to shape the edges to get at least ½ inch from flat edge if it was to merge boards with the rim or groove. The axe was the tool employed for shaping the edges on the first stages. It was only with the band saw when wooden panels were regularly shaped in its edges and become a standardized dimensions product. Various manuals were marketed to extend the design model and the joinery factory product catalogues for being supplied as processed commodities for local builders.
In the analyzed buildings, the length of the panels is directly related with the high of the ground floor, approximately two meters and twenty centimetres as a maximum length. The building’s upper floor was panelled with another panel shipment. The meeting between them was made up and decorated in different ways and in accordance with the architectonic style of the building, from austere solutions to those linked with the “national character”.

The boards were nailed directly to the timber frame with three spikes, made from handmade forged iron till industrialised rustproof or stainless ones. One spike was located at the bottom, other in the middle and the third one at the top. The nail was positioned in the middle of the board. Also the covering strips were nailed with one or two nails, depending on the thickness and always in the centre, to avoid breakages when the wood becomes dry, passing through the dashboard and getting anchored into the body.

According with the colour of the buildings, the most found are painted with the Swedish characteristic red paint. Originally it was done with limewash coloured by minerals containing sand; subsequently a red paint in oil based was commonly used on farms and other rural building facades. A heavily exposed facade may need to be painted twice a year to be completely protected. A common notion is that limewash was only used for sawn timber and oil paint was used on planed one (Almevik, 2004). The different methods of woodworking and the various types of covering layers can be distinguished because they produce different shadow effects on the materiality of the façade.

Currently, and due to the survival of certain handmade techniques inside this industrial and technological era, this pre-industrial process are affected with certain values, many of them linked with a tangible approach but the most of them linked with intangible values that are commonly transmitted between generations, neighbours and other sort of cultural associations. In this sense, today, its survival is clearly important by means of a correct maintenance and repair. But how to repair a traditional hand-planed panel is unfortunately not a common knowledge of today's construction workers, although in some cases there are some museums, municipalities or even craftsmanship schools offering their assistance to train or improve builder’s knowledge towards respectful refurbishments (Fig. 5-6).

As it will see below, some of the analyzed buildings have suffered several transformations along its history. As it has been said, the whole buildings related with the railways were nationalised and the national board in charge of the stations management sold some of them to families when the railways activity was finished. The most of the stations were converted into single family houses. In this sense, under the technical development of Swedish single-family houses construction, during the period 1930-75, many of the ideas in connection with reforming building techniques in this field were brought from other countries, mainly from the USA, where standardization and material-saving and time- saving methods of work had been developed.

Furthermore, the Government housing authorities assumed the responsibility for spreading information on modern building techniques both to the general public and to building contractors. The new technical ideas were also spread via various housing societies and magazines and periodicals. This can allow us to have an idea of what effects the new building techniques had on the house owners, and on the building contractors (Jönsson, 1992) (see the annexed inventory; tables 4 to 6).
Figure 5

Figure 5 contain some examples of panels and joinery details. The most of the analyzed stations shows a type of building in wood panelled setting, with mouldings and joinery details in broad agreement with Edelsvärs and Löfvenskold's published models (Linde, 2010). In some of them, great care was given in the joinery details design. Although the station buildings were similar in general, there were variations in the detailed design and materials processing. Different marquetry shapes have been found on the covering strips in charge to hide the joints between panels. A covering wooden strip which (inside the different models found) originally was thicker and wider because of the course and manual edging of the boards, has subsequently evolved into more slender wooden strips because the mechanical shaping of the edges of the boards. In turn, they have undergone a process of stylistic evolution that has given them different shapes and forms, related to different architectural trends that buildings have suffered throughout their history.

At the bottom, figure 4 exposes the different kind of decorated beams found in each line. From the first till the third, each pair of beams belongs to its correspondent railway.

Figure 6 shows some differences that can be found in the analysis and dating of strips and nails comparing the different elements of each station. On strips because their texture and their size, on the nails because the thick of the head and subsequently because their materiality, from forge to stainless.
3.3.2. Landscape

The research involving specifically these buildings, and no others, was mainly related with the necessity of understanding what it is happening today. Mainly on the dynamics of the heritage and on people’s knowledge linked with a landscape where the main signals or symbols that can allow recognising at a first sight its historical activity, practically have disappeared. Thus, this research related with a specific heritage and its long term management has been developed involving specific buildings and environments were never have had a direct affection from specific regional or national recognition because its peculiarities. This environment is not recognized by any heritage board, then, this situation allow us to study its flows and current situation under the logical sequence of events occurred along its history.

As it has been said before, the railway in Sweden supposed the transformation of many landscapes; a new type of power line cutting through the countryside and communities (Nordin, 1986) supposed serious affections on tangible and intangible behaviors. A particularly severe and pervasive change was developed when in a completely new way a person could travel at much higher speeds than ox or horse carriages offered; or with the possibility of having diary or weekly news coming from the outsiders of the farm or the village.

Thus, the station building was a new public space, a window to the outside world, as the advent of the local early development. In addition to those who lived and worked at the station was the stream of travelers, but also people who used the station as a meeting place, where they could establish social contacts and get the latest information (Linde, 2010). The important affection of the narrow railway’s history in Västrå Götaland, is the building stock, which in turn represent those “new” urban settlements forming nodes, farms, villages and cities that grew because the direct affection of development desires and progress believes around new ways of communication.

Particularly, and along its history, some rural stations were suffering transformations when the activity surrounding it was increasing; when freight and passenger operations sometimes had to be
separated, or even located in detached spaces, which meant that the station buildings sometimes had to be enlarged or changed. (Linde, 2010). Some other rural stations were slightly transformed probably influenced aesthetically by the great Stockholm exhibition in 1897 or other later agricultural exhibitions, the most of them on the line Lidköping-Stenstorps.

At the turn of the century, private railway companies got a good economy. The train ride had become a common and thus natural way to move on. Tourism soon was available along these lines and some citizens were attracted because the natural beauty of these inlands. (Linde, 2010). The aid of a general interest on aesthetics in urban societies helped the attraction for these places (Linn, 1986), the first pictures from the railways were attributed to the itinerant rural photographer August Nyman (Freding, 1979). But, unfortunately, the strong forces of change have perhaps become more apparent during the last few years (Nordin, 1986). The closure of the stations changed the service structure in rural areas that have grown up in connection with the railroad.

The different stages of the railways have evolved from being a link in between communities to today’s special artifacts of the past; symbols of the railways cultural history that are being forgotten and dislocated (Axelsson, 2006). New economic developments and requirements are the affections related with modern life and efficient means of transport. Thus, it is possible to say that this kind of cyclic history is being closed. If this is the harsh reality, there are not too many options on closing the circle of this specific Built environment Life Cycle. In the most of these circles, cultural heritage administrations and other administrations in charge of building stocks establish their power over collective memory by means of choices. These are selective elections that would affect the conservation or reproduction of the past directly concerning inhabitant’s knowledge or oblivion.

Nowadays we have more issues than the specific actions mentioned on the materiality of the stations. Preserve should mean, not forget, and this is mostly related with the aesthetical perceptions –culture and knowledge- not only transmitted by an amount of dislocated buildings. After all, when one has become familiar with the historical and economical development of these environments, it is not difficult to see how plainly this development can be read in each place (Améen, 1986). Today, second generations live and perform the landscape which contained sensations and desires on their ancestors’ lifestyle. The lifestyle is gone but some sons still remember places orally transmitted by thirds (Fig. 7).

Landscape is not only recognizable by marks or symbols from historic tenses, landscape is also sharing contemporary experiences in the place where took place others, nor more important and nor less important; just experiences. To do that, is not only important to recognize milestones like property entrances on the boundaries of the railways nor is only important to perceive some cellars in places were the station no longer exist. All these elements talk about a specific lifestyle that not too many people is able to recognize because are not linked any more with the “chosen” elements. But this is not a shame, this talk about the natural consequences of a complex process of landscape management in which these environments have evolved. This process has done that many stretches of railway remain with its macadam, the slopes and the perfect stroke of some loops. In others, the path has disappeared because the invasion of some fields; the path is no longer recognizable and the communication, by foot, bicycle or horse is impossible.

The importance today, for preserving intangible values linked with contemporary experiences, is not to pay attention on how many stations remain, if some bridges or other structures are preserved or if some museum is opened offering to some citizens a Sunday trip along few kilometres of railway. The relevant and complex thing would be re-open connexions between locals, for its leisure activities, to spread contemporary experiences and knowledge along some historical and some new stretches of railroad; new stretches that should accept current affections being traced following the field’s boundaries. Thus, built environments evolution should mainly
Figure 7 expose different artifacts directly related with the activity of the railways. Some of them have obvious importance, but not only because its materiality, also because the place is still taken up in some neighbours minds. The first is a scheme of the foundations of a railway junction called Svensbro. It was for a long time a busy Junction on the line between Hjo and Stenstorp. The junction had station and other related buildings, a large yard with six tracks in width and the biggest and impressive garden that couldn’t be found in the whole railway; the area covered about 2000 square meters. The drawing shows what remains today. Physically is almost nothing remaining, but the intangible value of the place is directly related with people experiences on sharing knowledge and telling stories. As is shown in the photo Svensbro is lost in the middle of the forest but experiences are still alive. To find the place the researcher who writes these lines, in the middle of its prospection, asked a farmer, under evident signals of complicated comprehension, about the existence of a place called Svensbro. The farmer invited the foreigner to go inside his tractor till the place he was looking for. The experience has probably been unique for both; the researcher will never forget the “deep” smell of the Swedish countryside inside the tractor, and the farmer, probably will never forget the day when a foreigner asked him about this “forgotten” place.

The second scheme is related with the lifestyle around guard cabins and those typologies of station which do not had ground floor. Cellars were built to store food, and other goods for the daily life of the railway employee. Because the distances to other villages or farms were not so large, the existence of cellars is telling us something about the requirements of the job and its exhaustive dedication.
rest on the continuity of some experiences, allowing maintaining alive the process of transformation and adaptation.

In other terms, this reflection establish a specific gaze, in terms of long term analysis, to reveal the importance of built environments for those who have lived, worked or inherited it, and what significance it has today on the local knowledge. Therefore this argument goes towards to manage efficiently current stocks far from maintain it as a mere symbols, looking for the current dynamism and progress of built environments that their ancestors looked for. Probably, those places will deserve being part of the history in the coming future if they achieve to fit in each contemporary process not just as scenarios with a pinch of history or even certain peculiarities.

4. Built environments: local stocks under global management criteria

Today the different aspects of sustainable development are generally recognised. From the sphere of humanities cultural aspects of the built environment conservation has been taken into account towards its cultural diversity and its management. The topic has been largely tackled by many authors, architects, historians, archaeologist, and also many international institutions. From the sphere of engineers and other technicians linked with the built stock some approaches to the cultural connotations of the stock have occurred lately inside the domains of the eco-efficiency and sustainability as an another component to have in account in relation with its valuation.

Till now, a common sphere of approaching has not had into account, probably because the use of different dialectics. Which has been demonstrated is that current approaches and current policies of development are highly confronted at international level with worsening poverty, hunger, ill health, illiteracy and the continuing deterioration of ecosystems. Thus, has been demonstrated that neither of both spheres implicated in the analysis of built places, environments or stocks, can afford solutions by their own towards a sustainable development.

From the sphere of economics we can talk in terms of Building Management where their dialectics are behind of the Total Economic Value (TVE). It is said that each good has different attributes, concrete and measured, while others, intangible or more difficult to quantify are referred under Bequest Value (Bequest, 2000). Those which work on the economical aspects of the built environment talk about built or urban systems which cannot be separated from its spatial environment, national, regional or even local systems, also related with human activity (culture, relations, and so on).

But, instead of what they understand in relation with these other values, they bet on buildings as objects that need more (cumulated) mass flow per unit of surface and less long-time (Lichfield, 1988) (Kohler, Hassler, 2012). In these sense, there is a permanent discussion on resource values in cultural heritage conservation (Mohr and Schmidt, 1997), which the economist Lichfield tackled as a kind of biological process by means of the notion of obsolescence:
1. Physical or structural deterioration
2. Functional quality
3. Environment and surroundings changes
4. Environmental unsuitability

In this point, economists talk in terms of system climax, production, stabilization and steady state and long term transformation of urban systems. But not being agree specifically with these terms, in the Life-Cycle process must be distinguished terms between natural life cycle of the building (the one proposed over here), and the life cycle of built environments (with the whole bequest values) not only with the sustainable and economical approaches (Kohler, Hassler, 2012). The main societal objectives related to the building stock should be to reduce its material and energy
throughput, and maintain – on a sustainable basis – its capital and social value as a complex resource over the long-term (Kohler et al, 2009).

The later proposals suggested that, decisions making should rest on “institutional regimes” with should give us the most appropriated solutions than current short-term, market-based policies (Hassler, 2009). Probably this suggestions talk about “alternative policies”, or selective policies in which demolition is a consensual and balanced decision because economic capital values are closely linked to social capital issues. But, it must be said that no all countries have the same backwardness on preservation policies and less than in policies of social-cultural integration, discussion, and decision-making. Then, there, institutional regimes are not truly qualified to reach a balanced decision on built environments. In this case, I would like to approach the long term decision making on the chosen case study of Sweden, and probably, looking forward ahead on this study engage further analysis for possible solutions.

In the present case study the long term decision making is reflected on the nationalization of the Swedish railway, basically decided by the parliament on 1939. When it was effective, in 1956, the national board in charge managed approximately 16,500 buildings in the whole country. Despite the amount of buildings, guard cabins were continuously disappearing previously. In the 1920s, some guard cabins were combined with interchanges to take care of the “small parts of the stretch, and also other venues and loadings” (Axelsson, 2008). During the nationalization, several cleaning patrols were used along those railways in which remain traffic. Moreover, in this specific case, the transfer of rural public transport to bus companies was the announced end to some small buildings along narrow gauge railways (Linn, 1986).

During the 40’s and 50’s, during the railways nationalization process, unneeded buildings were leased or demolished. Some guard cabins as everything else, that not were required for operation of the railway was removed, sold if possible, or otherwise demolished. Some of the elements and buildings remain fairly unadulterated and this fact cannot be overlooked, although some of those that were sold to become houses have suffered several refurbishments and evident changes during the building adaptation.

A Likely evolution on the preservation of the buildings was related with its sustainability. As long as the building was economically useful it was maintained or refurbished; extend their life-cycle was generally considered the first option. If it was not able, buildings were moved, re-built or even demolished as a last choice. In any case hopefully it must be said that sale was in many cases the only way to get a building preserved (Nordin, 1986). The analysis offers an example of building management linking this specific built stock with its contemporary socio-economic situation, in which its survival were clearly conditioned because its occupancy. The current investigation of the age and survival of the analyzed materials and the analysis of the whole building stock has been possible because all of them have had a continuous life-cycle.

The relatively low speed of transformation of this built environment dated on the late 19th Century has allowed a highly relevant analysis of the history, shape and materials of these buildings towards its understanding and management. Thus, the conservation of the physical, economic, social and cultural value of the building stock can only be reached as this case, through a comprehensive evolution, in terms of occupation, maintenance, energy and appearance of the stock (Table 1-2).
5. The Socio-Cultural Cycle Assessment on Built Environments

Different perceptions under the same field are coming close to tackle the problematic found in between the common field of built spaces. Nowadays its being talking about bequest values over built stocks in terms of situation value. It arises from the effect of the building on its surroundings by means of its historic–cultural value, as a representative building of a specific cultural epoch. Furthermore, craftsmanship and its socio-cultural values, which arise from its suitability for use by specific occupational, societal, age or ethnic groups, should also be taken into account. It is possible to establish relations between the value of built heritage and the cultural value of the stock, but at the same time, is not really easy to establish simple relations between different types of ‘intangible value’ (Kohler, Hassler, 2012).

Lately, those who have been really close to terms linked with the iconographic conservation have said that some places with outstanding universal values (Pereira, Ron van Oers, 2012) have suffered the growing tension between globalization and local development. That has provoked, in not a few places, incompatible new development in historic settings, unsustainable tourism, and overall environmental degradation, which all bring about new challenges to urban heritage conservation and its management (van Oers, Pereira, 2012). Also, quite recently, some recommendations have promoted new ways to include various aspects of conservation in an integrated framework. Ways to reach consensus, to assess and integrate vulnerabilities, to prioritize actions or to establish appropriated partnerships (Bandarin and van Oers, 2012).
The last interpretation forces us to understand each place avoiding general theoretical challenges only because the most important could be the object and its materiality. Despite its importance, other sources and strategies must be taken into account in order to involve all factors which conditioning its existence. Research on built spaces requires a discerning knowledge of chronological sequences of forms features and details (Lonsbury, 2010). We should avoid scenarios and try to comprehend behaviours and flows of each society or network (Schweber, Harty, 2010) to make inclusive theoretical challenges as a matter of socio-cultural congruence. Understand built places management as a complex entity far from previous conventions in which “external” challenges over objects, people and places less developed culturally, intellectually, and economically, can provide us a smart understanding of specific environments occupancy, maintenance, transformations, transmigrations, popular culture and even art (García Esparza, 2012a).

In this view, the concept of material significance is redundant since it is impossible to understand the built place that is immaterial, but a better understanding can be made from terms which exceed materiality. As some artifacts, the most of the buildings are not just tools for survival or pieces to expose in museums; use, maintenance, recycling, reuse and discard, are “constitutive processes” that make culture (Chilton, 1999).

“The vital significance of a chair, for example, does not lie in the wood or plastic used to build it, but rather in our understanding of it as a place to sit, read, write, eat, or play with children.” (Mukerji, 2010).

Both those who sit on the chair and those who provide raw materials for it are connected culturally by those who fashion chairs and those who manage technology. Thus, material knowledge and its usage are due to socio-cultural orders.

In the process of quantifying values of built environments in order to improve the assessment on built stocks, previous works has suggested some indicators for a sustainable development. The most developed has been the ecological indicator which evaluate resource consumptions and impacts on the ecosystem by means of Life Cycle Assessment (LCA). There also exists the macroeconomic valuation of ecological and cultural resources, deeply analysed by the World Bank publications (World Bank, 1998). Socio-cultural indicators has been briefly outlined or commented in relation of the sustainable development of buildings. In this field, the succession cycle of physical condition, population changes, organizational changes and economic changes are described thoroughly in the literature (Mandanpour et al., 1998).

Cultural indicators of sustainable development are based on a broad definition of the cultural – architectural- heritage; mostly developed as an international level by the most prestigious centres of knowledge and other associations (Unesco, 2011). Below, as was already suggested by other authors, the challenge is to give an explanation about which terms must be taken in consideration to elaborate some indicators over a-priori intangible values for the management of building stocks taking into account the socio-cultural affections over the built environment; not only to be treated as a pure stock, also to ensure the propagation of cultural memory, social knowledge and its continuity in performative contexts (Vision, 2030).

The socio-cultural affection on built environments and its repercussions on built stock need different spheres of approach. As will be developed below, five spheres or scales have been proposed in the explanation of the measurable factors which intervene in the socio-cultural influences over decision making on built environment flows and transformations. To this, four terms have been employed to measure the different aspects analyzed inside each scale. These terms are those which will offer the rates that we look for on the built stock. Occupancy which covers ranges from abandon, decay and demolition to the risk of; Maintenance which covers the range from physical pathologies to inhabitability or sub-standard housing, Energy which covers...
the range of changes and adaptations of the building -from those incompatibles to those perfectly respectful- and Appearance which covers the range of external influences to local tendencies. To evaluate the process, these terms will be affected by changeable aspects depending on the scale or sphere of analysis as is explained as follows.

From recent studies has been suggested the necessity of assessments and data collections in order to develop “certainly rates” (e.g. on demolition and vacancies) to achieve a comprehensive understanding on the evolution of each country and between some of them. These rates must be understood just from a global gaze, what we will call a Country Scale. In socio-cultural terms is quite complicated to combine rates and even indicators if we first do not analyze the particularities of each country. Different aspects have been proposed to establish a country scale.

The stock of built environments in different countries will be affected in the same terms, those which have been exposed before. These terms can be rated in each country depending on the following aspects: on economy, measurable in terms of migration or permanency of its population; on health of its inhabitants, measurable in terms of hunger and welfare; on education, measurable in terms of illiteracy and alphabet, or on politics, measurable in terms of history and its current levels of democracy.

The next step is the Regional Scale in which two of the aspects analyzed before remain, but the others have been transformed for a better understanding. The first aspect is based on economy, measurable in terms of infrastructures, which can affect directly on inequity or balanced growths of different built environments; on health, depending on the levels of mobility or stativity of the assistance system; on culture, because it can be directly related with the proximity or the inexistence of centers of knowledge, universities, museums, etc; on traditions, it depends on the absence of experts or the existence of specific committees and boards; and finally, on legislation, because it can be understood as invasive and restrictive or respectful with the logical dynamics of each specific built environment.

The next step is the Local Scale, in it all aspects coming from the regional scale are maintained, but instead of health now this aspect is referred as welfare. Thus, the socio-cultural affections over the stock of built environments come more specific. On economy, the statistics of local business and near markets affect directly on its inhabitants; on welfare, the standards of living related with specific needs and specific responses of the health system can be measured as low or high; on culture, the absence of information sources or the existence of chroniclers or intellectuals along the history of the place can also be rated; on traditions, the affection of external building materials or even construction systems could be confronted with those environments in which remain local materials and traditional systems of construction; and, on legislation, specifically related with tradition, its inexistency can affect directly on the integrity of the stock in front of those places in which exist some kind of rules and patterns that can also be an economical support.

A major focus can be achieved with a magnifying glass on Individual Scale, referred to second generations of individuals which, before the analysis of the previous scales, still remain or definitely left the built environment. But, the individual’s perception can provoke from small migrations to big transformations, all of them included in this level. This scale and the next one can help us to understand more specifically the individual’s behavior towards the built stock. At this level, these aspects can be a little bit more difficult to estimate than the previous ones but it is still possible if the estimation is based on opinion polls.

On the aspect of economy, individuals look for their stability or major expectations on its personal situation related with work and housing associated with previous generations; on welfare, because the health assistance, individual’s sickness and mobility or desired levels of comfort can be
directly affected by the structure of the built environment; on culture, rates depend on the availability of individual’s information and experiences, which directly affects to their sense of belonging and sensitivity towards the place; on tradition, rates can fluctuate from the inexistence of seminars or other activities related with the place till the existence of oral and visual transmissions by third people; on legislation, it could depend on the way it was promulgated, which means, if it was imposed by governor’s board, or if it was agreed with inhabitants.

The last Scale is based on Media affections. At a first sight it can seem irrelevant but nowadays mostly everything is affected by media. Also those inhabitants who live, lived or once leaved a specific built environment. Inside this scale the aspect of legislation has been avoided, because seemed redundant, and it has been added the term tourism. Currently, every aspect can be tested by media and, through a glance over regional or local media, we can understand if it is working on the permanence, belonging, and stability of built environments.

It must be noted that media sometimes can be a fickle channel of communication; the communicator cannot pretend to attract the interest of people’s mind towards built environments by media sources if the interest has not been manifested in previous scales. In spite of said, media always can help to achieve highest levels of knowledge in refurbishment and maintenance according with traditions, and highest levels of culture based on energy efficiency by means of strategies on specific environments, spaces and stocks.

Because the most important thing is to revitalize environments optimizing its occupation, those terms related with energy has been estimated in the designed scale as more important than those linked with the appearance. This attempt to evaluate the influence of third factors (Brugger, Frey, 1985) over the built environment tries to analyze the process from its destabilization to a hypothetical optimization. Building destabilization process affects two environments, the old one and the new one. As far as the questions of flows, a relative and understandable equilibrium inside each country could be a good approach to high rates of efficiency in built stock; an equilibrated society at any level (Table 3).

All items reflected on the schedule could be measured with a more rigorous and accurately approach by LCA methodologies and tools on the analysis of specific built stock, specifically those in which the population imbalances at a regional and national scale are evident. The proposed scale emerges from socio-cultural values and necessities and is directly related with the equilibrium of built environments by means of the welfare and culture of its inhabitants; intimate linked with the appearance of the historical sites. Besides, the scale is directly related with the built stock efficiency having in account the particularities of the socio-cultural knowledge on building maintenance and its adequacy to improve the eco-efficiency of the settlements.
Theoretical Challenges Sphere
Conservation - Management
Sustainability - Development

Socio-cultural affections over tangible and intangible values

Country Scale
- Migrations
- Feeding
- Alphabetism
- Human Rights
- Abandon — Maintenance — Energy — Appearance

Regional Scale
- Infrastructures
- Assistance
- Centres of Knowledge
- Experts-Comitees
- Abandon — Maintenance — Energy — Appearance

Local Scale
- Work
- Standards of living
- Chroniclers
- Materiality
- Rules-Patterns
- Abandon — Maintenance — Energy — Appearance

Individual Scale
- Stability
- Expectancies
- Experiences
- Transmissions
- Adequacy
- Abandon — Maintenance — Energy — Appearance

Media Scale
- Management-Development
- Health systems
- Knowledge
- Experiences
- Respect
- Abandon — Maintenance — Energy — Appearance
Conclusions

In accordance to stabilize built environments by means of its stocks, “establishing in all countries a consistent basic data on the whole building” (Kohler, Hassler, 2012) and link it with local or regional construction activity statistics would depend on the development of each region, or even of each country. It should be justified because high levels of consumption than similar environments under similar value criteria (economy, politics, development...). To do that, it should be mandatory to discern built stocks by construction typology and epoch, because not the whole built stock needs to be intervened and not all the stock needs the same rules or applications.

Stable regions, with stable population, with stable levels of consumption and respect on the built environment must be the example of others under a relative same conditions or same value criteria. The simple fact of seeing others turns out to involve a complex set of constructive procedures and interpretive understanding. Built places should seek for a common focus between cultural seeing and functional seeing. A relation carried out in ways that relate local costumes, uses and traditions with technology, apparatuses and devices coming from a truly global scale.

To do that, we need to appeal society’s daily life introducing the most quantity of knowledge and culture we can, a high level of participation with clear and justified decision-making towards the benefit of built places and its inhabitants. Because the proposed focus on relevant aspects of cultural and functional activities is related with buildings, behavioural chains are useful for reconstructing particular processes and technologies encompassing consumption and use. Thus, consumers are usually the final arbiters of a technology success. How and why community of users determines whether a technology is successful depends on how consumers acquire knowledge about its functions.

Annex

- Example of inventory table.
| Location       | Station | Guardian | Public | Private | Use | Condition | Roof | Maintenance | Handicraft | Pathology | Other | Buildings | N | V | 12 | D | 0 | 7 | 0 | 8 | 7 | V | G | 10 | N | D | 0 | N | C-Scale |
|----------------|---------|----------|--------|---------|-----|------------|------|-------------|------------|------------|-------|----------|---------|----------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| Udevalla       | Yes     | No       | Yes    | No       |      |            |      |             |            |            |       |          |         |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Udevalla S.J.  | Yes     | No       | Yes    | No       |      |            |      |             |            |            |       |          |         |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Köpperöd       | Yes     | Yes      | No     | No       |      |            |      |             |            |            |       |          |         |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Nättebacka     | Yes     | Yes      | Yes    | No       |      |            |      |             |            |            |       |          |         |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Sundsbun       | Yes     | Yes      | Yes    | No       |      |            |      |             |            |            |       |          |         |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Ellenö         | Yes     | Yes      | No     | No       |      |            |      |             |            |            |       |          |         |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Ödeborg        | Yes     | Yes      | Yes    | No       |      |            |      |             |            |            |       |          |         |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Färgelelanda   | Yes     | No       | Yes    | No       |      |            |      |             |            |            |       |          |         |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Hjärtsäter     | Yes     | No       | Yes    | No       |      |            |      |             |            |            |       |          |         |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Högsäter       | Yes     | No       | Yes    | No       |      |            |      |             |            |            |       |          |         |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Tångelanda     | Yes     | Yes      | Yes    | No       |      |            |      |             |            |            |       |          |         |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Skällsäter     | Yes     | Yes      | No     | No       |      |            |      |             |            |            |       |          |         |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Störa Bön      | Yes     | Yes      | Yes    | No       |      |            |      |             |            |            |       |          |         |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Bäckefors      | Yes     | No       | Yes    | No       |      |            |      |             |            |            |       |          |         |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Alltorp        | Yes     | Yes      | Yes    | No       |      |            |      |             |            |            |       |          |         |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Ödsköld        | Yes     | No       | Yes    | No       |      |            |      |             |            |            |       |          |         |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Dingelvik      | Yes     | No       | Yes    | No       |      |            |      |             |            |            |       |          |         |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Billingsfors   | Yes     | No       | Yes    | No       |      |            |      |             |            |            |       |          |         |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |
| Bengtfor       | Yes     | No       | Yes    | No       |      |            |      |             |            |            |       |          |         |          |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |      |

**Table 6**

Tables 1 to 3 are the result of the inventory developed during an intensive field work. The inventory was possible by means of the regional transports; trains and buses. Collecting data, after analyzing digital cartography, consisted into visit, sometimes by public transport and oftentimes by foot, each place in where a station or guard cabin were built when the railway was opened to the traffic.

The value of the inventory rests on an accurate analysis of the state of each building, without exclude anyone. To analyze it, has taken in account three concepts: 1. The existence of original features. Valuated in a scale of five levels, 1.1. Original, 1.2. Original with punctual repairs, 1.3. Original with quite repairs, 1.4. Partially changed and 1.5. Completely changed. Other concept is 2. The existence of handicrafts or specific woodworks. Valuated on two levels, 2.1. The existence of the original beams on the roof, 2.2. The conservation of wall panels, strips, nails, etc. The last concept has been the analysis of its integrity by means of pathologies found. To do that, pathologies were classified in three levels: 3.1. Major, related without well solved foundation humidity which can derive in ground floor rot or even walls rot. The second level, 3.2. Minor, mostly related with the lack of maintenance based on paintings deterioration, Ironworks rusted, Dirty because pollution and Fungus. The last level was related with the absence of pathologies.

In accordance to previously exposed, a Conservation Scale was established. It is differentiated between those buildings that still remain in the same place in which were built valued in a four steps scale: V, very good, G, good, O, ordinary, or T, transformed. Those that no longer exist were classified in: N, new, D, disappeared, R, ruin.