

Article

Adaptive Reuse of Social and Healthcare Structures: The Case Study as a Research Strategy

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Abstract: The regeneration and reuse of abandoned healthcare facilities represent one of the most complex issues in the broader field of disused public architectural heritage and its valorization. The leading causes of an elevated quantity of abandoned hospitals are the lack of resilience of these structures, as well as the evolution of the regulatory framework used to increase the quality standards of the National Health System and the constant changes caused by medical discoveries. In addition, the transfer to a new building typically does not involve consideration of the future of the dismissed facility with a lack of a strategic view for its regeneration, thus causing its progressive degradation. Although their large dimensions and unbuilt areas make recovery plans complex, the re-functionalization of these facilities represents an excellent opportunity for social and economic development, as several case studies demonstrate. This paper selects some useful examples of the reconversion and reuse of disused social and healthcare buildings through an accurate comparison that highlights the importance of the topic and the possible actions to be taken into consideration. Although this research focuses on a limited number of case studies, the paper gives rise to some strategies that can be applied to several current cases of disused buildings that could be used to support Decision Makers (DMs) from different countries.

Keywords: regeneration; adaptive reuse; healthcare facilities; hospital reconversion; design strategies



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1. Introduction

The history of architecture has demonstrated how social, political, and economic transformations strongly affect the design of healthcare settings and the environments that host public functions and social activities. With the changing demands of society, the relationships among various factors highly influence the modalities by which the hospitals and the spaces themselves respond to new needs [1].

The evolution of health architecture, along with the transformation and modification of types of assistance and therapeutic actions, can be analyzed throughout history; in fact, the economist Jacques Attali stated in the book *Life and Death of Medicine* that there is a concrete passage from places where we atone for sins, to spaces where we stop “being sick,” to those of a dynamic network nature [2]. *Hospitalia*, the original Latin term for hospital, means “guest room”. Parallel to this evolution, hospital structural components, technologies, performance, organizational issues, and layouts of functional areas have also all adapted. In the beginning, hospitals were created as environments where hospitalization was at the center of the entire system. Over time, through discoveries in the field of genetic research and its applications, biotechnologies, and the development of information technologies, the purposes of these facilities have expanded to include training, research, and other services [3].

Beginning from the motto “prevention is better than cure,” current hospital facilities host not only inpatients, but are also used by healthy individuals, directed to outpatient and diagnostic services, suitable for prevention and health promotion [4]. Thus, healthcare architecture, such as other urban services, becomes an active element of cities and public life for the prevention of disease and the promotion of the health of citizens, as well as creating a valuable identity for the community [5]. In recent decades, to improve access to services, promote user satisfaction, and increase the efficiency and effectiveness of health systems, health infrastructure networks have been established by different countries, creating new structures of the organizational systems inside cities [6].

Difficulties in providing responses to the recent global pandemic crisis were strongly influenced by the results of economic cuts in the health sector, with which the National Health System (NHS) tried to comply by using temporary hospital structures. It remains difficult to predict future developments and repercussions of this health crisis in social and economic terms [7,8] although it is now possible and even essential to take advantage of this renewed attention to the health sector to highlight possible economic and design strategies useful for supporting the system in the future.

Although newly constructed buildings can better respond to both current and future demands of healthcare (in terms of flexibility, technology, and structural issues, etc.), it is fundamental to consider what happens to disused buildings after their lifecycles end [9]. In fact, these facilities, after several decades, obtain a social value with many of them being safeguarded by competent offices to ensure their physical and historical integrity. It is evident that such heritage can represent a high-quality resource for both the public and private sector if properly valued.

The three architectural typologies that historically characterize these buildings are pavilion, monoblock, and polyblock. These are variably used depending on the type of pathologies treated and therapy methods, though they all tend to be massive structures located in the suburbs of cities [10]. Their physical configurations and locations are some of the critical points of the reconversion process and contemporary adaptation, dictating compatibility with things such as hospitality or office functions, two common solutions for recovery processes. Occasionally, the conversion involves the establishment of public and cultural functions, and rarely, social housing is developed.

In several European countries, legislation regarding building protections is very limited, while in others—especially for infrastructure of social importance—they are very strict [11]. As such, these different approaches highly influence the conservation methods and the lifecycle of structures, providing useful case studies, such as the Martini Hospital in Groningen, Netherlands, which was built using the principle that it would be totally disassembled or demolished when its lifecycle ended [12].

Most commonly, as emphasized by the scientific community, re-evaluating an architectural asset through its physical and functional enhancement is to be considered a proper choice in terms of sustainable recovery [13]. For example, within the Italian context, there exists a Code of Cultural Heritage and Landscape by which the government promotes the development of culture, scientific, and technical research; the protection of the landscape; and historical and artistic heritage [14,15].

To recover an asset in a sustainable way, it is necessary to engage in a spatial, technological, and economic study so as to not compromise the potential reuse of the facility and its social identity [16]. For this reason, an in-depth analytical feasibility study is essential to determining the strengths and weaknesses of the intervention proposal. Presently, recovering an asset means not only restoring its original morphology but also, above all, enhancing its potential. In addition, because revaluations must follow sustainable environmental and economic logic, it is necessary to create consistent strategies [17,18].

The strategic actions must consider various fields of interest, including the study of the conservation status of the facility in order to be able to pre-estimate the costs of restoration [19]. This type of investigation is essential in the preliminary phase because it

allows for determining design strategies that can meet the demands and needs detected by the building itself and related contexts.

The evaluation of possible alternatives of reuse becomes a fundamental issue, as it allows for planning for which type of re-functionalization is the most suitable. In this case, it is necessary to know not only the intrinsic features of the property (building type, surfaces, any green areas available, etc.), but also the socio-economic issues in which the building is located and its position in the lifecycle [20]. Although it is quite arduous to explain, the functional program becomes an indispensable tool [21].

This strategy has been implemented in the past. As Pérez de Arce states, the reuse of buildings for different purposes during the French Revolution, such as military functions, was a widespread practice [22].

In contrast with the past, currently it is essential to describe the approach in a more precise and cultured way. In fact, it does not seem possible to determine a common and unique strategy for the reuse of buildings, because each case has its own intrinsic and extrinsic peculiarities [23–25]. It is therefore necessary to investigate various issues such as the degree of adaptability and flexibility of facilities, as well as the ability to merge new and existing buildings [3]. However, relationships between the past and the present have often been trivialized by unsuccessful design choices.

In general, the relationship between a building and its surroundings must be the key element in the proposal's explanation.

Among the actions that must be taken into consideration is the strategy of adaptive reuse which is aimed at reusing something that has lost its initial function by adapting it to a new specific environmental context. According to the Australian Department of Environment and Heritage, it is a process that changes discarded or inefficient properties into new ones that can be used for different purposes [26]. Starting from this definition, the adaptive reuse of a property must be able to foresee future scenarios, based on careful analyses that have been previously planned and addressed.

In terms of industrial and healthcare heritage buildings, it is essential to consider the adaptive reuse issue as an occasion of urban regeneration leading to economic and social growth [27,28]. As several reports on the European Union highlighted, many European Countries have applied similar strategies, including Portugal, Sweden, Spain, Latvia, Italy, Greece, Bulgaria, Cyprus, Romania, etc. For example, according to the Italian National Institute of Statistics (Istat) data, 5.2% of properties in Italy are in a state of disuse, of which almost 10,000 of them are public and ready for reconversion [14,29]. Among these, healthcare real estate represents one of the largest shares.

2. Research Strategy

The adaptive reuse of healthcare facilities can be a challenging and complex problem given the presence of conflictual values (e.g., minimizing initial cost, preserving historical aspects, compliance with specific contexts, etc.), as well as the involvement of both public and private stakeholders and the specificity of the building itself, all of which can create adaptive limits [30,31]. To understand which re-use strategy is most suitable by considering both the extrinsic and the intrinsic features of the building, an analytical framework has been created based on an investigation of case studies that are considered the best practices in the field and that are considered to be successful projects given the positive externalities generated toward their surrounding context and the revenues generated as a result of their new functions [18,20]. The decision to ground this research on case studies [32] allows for the detection of holistic and important characteristics of real-life processes. In this context, the first step to carry out a coherent research study is to state a precise research question for selecting an applicable sample of case studies. One of the most traditional biases in applying this methodology in research is the generalization of detected results, as explained by Lipset, Trow, and Coleman [33]: the final purpose is to perform a “generalizing” and not a “particularizing” analysis, in fact the final goal should seek to expand and generalize theories (analytic generalization) instead of enumerate frequencies (statical

generalization) [32]. By defining the borders of the research, it is simultaneously necessary to underline some assumptions about the willingness to cover contextual conditions pertinent to the phenomenon of study. It allows for empirical investigation into a topic by considering defined criteria.

Among the criteria for judging the quality of the research [32], in addition to validity, is the reliability which is not related to the replicability of the process with different case studies hoping to obtain the same results, but rather the achievement of the same conclusions starting from the same analysis. In fact, the case study method suggests that each case study can represent a complete study, where it is possible to detect evidence provided by its conclusions, which could support the theory definition and the replication by other individual cases [32].

Given this theoretical framework on case study research, and the objectives of defining some common outcomes in the adaptive reuse of healthcare facilities, Figure 1 synthesizes the steps developed in three specific phases in order to apply it:

1. *Case studies analysis.* A total of 12 cases of adaptive reuse of healthcare facilities have been selected by considering certain criteria to guide the decision, such as:
 - i. Location: in order to provide a broader set of examples, they are located in Italy, Europe, and Extra-EU;
 - ii. Year of the project: referring to recent interventions from the 2000s onwards;
 - iii. Owner: with a specific attention to public buildings;
 - iv. Assets: providing historical and cultural values from their features.

These four criteria worked as the main filter helping to identify the most suitable case studies in relation to the purpose of the research.

2. *Comparative analysis.* A fact-sheet has been generated for each case study as well as a final table to compare the characteristics analyzed. As we already explained, criteria have been defined by considering the available information for understanding the context, the building itself, the design concept, and the realized intervention of adaptive reuse. These features have been selected with a set of experts in the field of healthcare design and project appraisal.
3. *Adaptive reuse evidence.* According to the results of the previous steps, some conclusions have been detected by considering the main issues analyzed and potential correlations. In fact, this preliminary analysis allows us to understand if, according to the intrinsic characteristics of the building and the extrinsic context, it is possible to suggest a compatible set of adaptive reuse interventions.

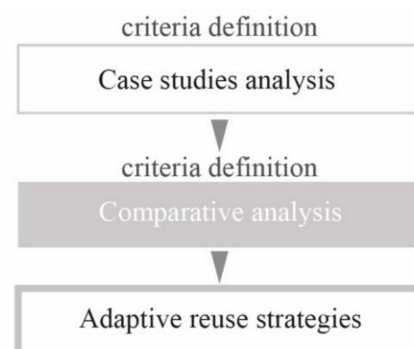


Figure 1. Phases of the research. Figure designed by the authors.

Given the proposed steps, the processes developed can be conceived as a strategic tool for analyzing case studies, elaborating on the data, and providing potential outcomes to support Decision Makers (DMs) in selecting the most suitable and coherent alternatives of adaptive reuse [34,35].

3. Case Study Analysis

Starting from the phases previously detailed within this section, the three steps will be better explained and applied to the context under analysis regarding the adaptive reuse of healthcare facilities. In particular, research has been carried out as part of the post graduate master's thesis of one of the authors [36] for the master's program in "Planning, Programming, and Design of Hospital and Healthcare Facilities" at Politecnico di Milano (Polytechnic University of Milan), Università degli Studi di Milano (University of Milan), and Università Cattolica del Sacro Cuore (Catholic University of the Sacred Heart) in Rome [37].

The first step (*Case studies analysis*) examined former historic public hospitals that have been recovered and reused in the last twenty years, as seen in Figure 2. In some cases, these healthcare facilities were sold to private actors who developed conversion strategies identifying their potential future use.



Figure 2. Case studies' locations [36]. Figure designed by the authors.

Referring to the availability of useful information from journals, magazines, web portals, and online pages, etc., the choice of the case studies considered the historical and cultural values that they represented for the community and their preservation by their respective bodies of protection. Thus, adaptive reuse becomes a concrete answer to questions raised by a society increasingly attentive to the conservation of cultural heritage but, at the same time, linked to an increasingly competitive model of economic development and the circular economy. In fact, the economic growth of a country is based on the ability of public institutions to reduce expenses, utilize its available resources, attract foreign capital, and create jobs. These are all issues that the adaptive reuse line of research can address.

The list of selected architectures for this research are:

- Ex Ospedale Vighi (ex-Vighi Hospital) in Parma (Italy) was a multi-specialist hospital, designed by the engineer Enrico Bovio in 1926, located near the ancient city walls. After its abandonment, it was put up for auction and sold in 2004 and transformed into a hotel [38,39]. Specifically, on the ground floor there is a banquet hall, the reception area, the administrative offices, and the restaurant; the first floor hosts the suites, and the rest of the rooms are located almost exclusively on the last floor. In total,

there are 70 rooms [39]. Outside, the green space has been redeveloped, respecting as much as possible the existing trees. The entire building, in addition to maintaining its architectural quality, was also equipped with the best technological solution for the production of energy through a geothermal system [39].

- Ex Ospedale degli Innocenti (ex-Innocents Hospital) in Florence (Italy), built with the intention of caring for and educating abandoned children, is one of the most important achievements of Florence and more generally of the entire Renaissance. It was designed by the architect Filippo Brunelleschi in 1445 [40]. In 2008, the building was transformed into a museum [41]. The main purpose of the project was to give rise to a museum for the city center, which would preserve the historical layout of the building as much as possible. For this reason, the designed art gallery foresees a “minimal” layout, characterized by inclined painted panels supported by aluminum structures. The incline of these panels permits the museum to hide the installations and to give depth to the museum paths. The selection of different construction and finishing materials is consistent with the aim to respect the existing structure through the use of wood, stone, and bronze [41].
- Ex Ospedale San Marco (ex-Saint Mark Hospital) in Venice (Italy) was built as a healthcare facility for tuberculosis. It was built in 1870 and located in the artificial island of Sacca Sessola in the South of the Venice lagoon. In 2010 the hospital was transformed into a hotel with 230 suites and the other buildings into services for the hospitality industry [42]. The masterplan reorganizes the island into three main parts, marked by the green areas. In the area of the previous hospital, 230 suites have been designed, while a terrace with a swimming pool has also been built [42]. Next to the large monoblock, the church was converted into a conference center, while the hospital director’s residence was transformed into a villa. All the pavilions have been recovered and redesigned preserving the existing walls thus leaving historical features of the original buildings intact [42]. The construction and recovery technologies involved the use of steel and concrete within the existing brick walls and pre-fabricated wooden structures. The old stables have been transformed into a spa [42].
- Ex Ospedale (ex-Hospital) in Lecco (Italy) was built as an extension of the historic hospital at the beginning of the 20th century and it was dismissed in 2003. In 2010, it was converted into department offices and a dormitory for Politecnico di Milano in Lecco [43]. It is located in a rather large area of the city center with classrooms, meeting rooms, and offices. The existing buildings (two mirrored pavilions) of the existing hospital have been recovered and reused for department offices [43]. For the reuse of the ancient structures, however, some interventions were necessary, such as the addition of connections that guarantee the passage between the two halls and the remaking of their large glass walls. The new L-shaped building rises two or three floors above ground plus an underground floor which houses parking lots. The system of open and closed courtyards tries to replicate the surrounding urban system, in which existing buildings and new ones are closely related [43].
- Ex Ospedale Morgagni (ex-Morgagni Hospital) in Forlì (Italy) was built at the end of the 1700s and after several enlargements during the first half of the 1800s it was composed of seven pavilions. At the beginning of the 19th century, it was modernized by the architect Tempioni. The hospital was abandoned in the 1970s and in 2000 a competition was launched for the construction of a university campus (University of Bologna) [44]. In general, the project considers the reconversion of three pavilions to become teaching buildings with the introduction of a pedestrian path, immersed in a dense green park over five hectares, and becoming an integral part of the city [44]. Another innovative aspect is related to the production of energy and heating of the entire campus. It is guaranteed by a district heating and cogeneration system which is currently the most efficient and green system. Great attention has been paid to the choice of masonry packages to guarantee a relatively low sound transmittance and to

acoustic panels that guarantee a reduction of foot traffic noise up to 20 dB to preserve the maximum soundproofing of study rooms and libraries [44].

- Ex ospedale Militare Hospital (ex-Military Hospital) in Catanzaro (Italy). The first hospital settlement of the city of Catanzaro was erected in 1400 and was subsequently the subject of numerous demolitions and volumetric additions, until the property passed to the army in the mid-1800s. In the second half of the XX century the building was dismissed [45] and after a public competition in 2010, it is currently being transformed into the Italian Public Prosecutor's Office [46]. The project, spread over four levels, from the basement to the third floor, provides for the recovery of the ancient structures. In particular, the intervention aims to realize a conservative restoration of the historic building and the demolition of the buildings with a low artistic value that were built after the original nucleus [46].
- Ex Ospedale del Mare (ex-Seaside Hospital) in Venice (Italy) is characterized by about thirty buildings built in different periods starting from 1870. Over the years, it became a reference point for the treatment of acute diseases, tuberculosis, etc., in the regional context. The first pavilions were closed in the 1970s followed by a constant dismantling of all departments due to a lack of maintenance which then led to its definitive closure in 2003. The reconversion project of 2017 provides the recovery and reuse of almost all the pavilions and the new construction of two buildings. It is expected to give rise to a hotel, the construction of a new hospital block, an international tourism school, and a wellness center [47].
- Ex Ospedale Psichiatrico (ex-Psychiatric Hospital) in Novara (Italy) was built in the mid-1700s housing primary care and assistance services. The psychiatric hospital was built a century later. It was enlarged little by little, expanding from 300 beds to approximately 2000. Following the approval of the Basaglia law in Italy in 1978, the structure began to be emptied and definitively closed in 1998. In 2007, the building was converted into a community healthcare center for territorial health services [48,49]. The objective of the intervention was to restore and subsequently transform the former psychiatric hospital into an integrated center for local health services. The new center hosts district offices of the local health authority, a specialist outpatient clinic, and two health care residences. In addition, in memory of the historical function of the hospital, there is a center for psychiatric activities [49]. The management of the building was defined through a Project Financing for a total duration of 27 years.
- Military Hospital in Toronto (Canada). In 1875 Smith and Gemmell designed a Victorian-style building that hosted a Presbyterian seminary, a military hospital, and a clinic. The structure was then converted into a clinic. It was abandoned and purchased in the early 1970s, to become Knox College for the faculty of architecture and design in Toronto [50]. The existing façade rises imposingly from the south, from which the large access avenue branches off to the city. Precisely on this side, there is a new large glazed curtain wall, whose stylistic rationality contrasts with a majestic brick building [50]. A very careful study of the green areas was developed with the use of native plants. A sloping promenade, dug from the ground floor, leads students and teachers to the lower level, where folding glass doors open to the classrooms. The recovery of the historic buildings is visible from the east, in which there are classrooms, the library, and offices. It is possible to see the merging of two different styles in which the gray concrete panels connect with dark brick walls [50].
- Cook County Hospital in Chicago (USA). The first works began in 1834 and ended in 1857, initially serving as a military hospital during the American Civil War. Later it became the most important medical university in the country. In the early 1900s it underwent important modernizations with collaboration with its doctors, becoming a reference point for medical progress in the world [51]. In 2002, the hospital functions were relocated into a new hospital and the building was dismissed. In 2018 the new reconversion project has been approved which includes the construction of new offices, restaurants, kindergartens, a museum, and a hotel with 210 rooms [52]. Despite the

abandonment, designers developed a recovery plan that would allow the façades and openings, arches, and terracotta materials that enriched the historic façade to be renovated. On the other hand, the interiors have been almost totally altered. The original structure rested on clay arches; the material was then brought back to the covering of the steel supporting columns [52].

- Richardson Olmsted Complex in Buffalo (USA) was designed by architect Henry Hobson Richardson. The structure was a military hospital. In the 1970s, some pavilions were demolished for new structures to treat psychiatric illnesses. During this time, the campus was slowly abandoned. By 1973 it was added to the National Register of Historic Places and in 1986 it was classified as a National Historic Landmark. In 2016, it was reconverted into a hotel with 88 suites [53]. The intervention provides for the total recovery of the most significant historical parts, with a few volumetric additions that allow the hotel to host 88 suites spread over more than 18,000 square meters (sqm). In general, the building has been preserved, maintaining its red brick walls, two large twin towers that overlook the structure, historical wooden stairs, and decorations on the whole facade [53].
- Hôtel-Dieu in Lyon (France) was the first hospital in this city and it was built in the XI century. Since its opening, it was one of the largest hospitals in France with nearly 400 beds. The hospital has always been closely linked to the history of the city of Lyon and to the progress of French medicine. In fact, the great wars and famines marked its morphological characteristics [54]. After the First World War, a museum was inaugurated, but it continued its medical and university function throughout the 20th century, until its final closure in 2010 and the transfer of its functions to the new Hospices Civils de Lyon. In 2011, the Hôtel-Dieu was included in the list of historical interest by the French government. Three years later the recovery and reuse work began which, leaving the external morphology intact, mainly concerned the division of the interior spaces into 150 luxury rooms, restaurants, bars, offices, and conference centers [55]. The reuse project of the Hôtel-Dieu is part of the broader urban redevelopment and recovery plan of the historic center of Lyon (France), well-known as “*Le Confluence*” [55]. The proposed architecture takes into account the sobriety of the interior spaces, and the majesty of the facades overlooking the Rhone. The idea behind the project, as the designers stated, is expressed by the concept of “monastic and precious”. In fact, the interiors have a great refinement of details, from the choice of fabrics to the different prestigious finishing materials that change continuously in any environment [55].

In the second phase (*Comparative analysis*), hospital analysis was supported by a fact-sheet where primary essential data was reported together with one or more representative pictures, plans (when available), and a brief description of the adaptive reuse project with detailed information on the intervention (the conservative actions, the design strategies, etc.). Figure 3 presents an example of the analysis developed for historical Hospital in Lecco (Italy).

The recovery and reuse projects examined consider specific aspects that have been synthetically reported in a table divided into “pre” and “post” adaptive reuse’s actions. The geographical location and the map of the territorial framework identify the spatial location. The historical function describes the healthcare activity of the building before the intervention, while the current function represents the use for which it has been designed. Mentioning pre and post features is essential to understand the design choices of the historic building and at the same time to know the architectural intentions of recovery. This topic is connected to that of historical buildings and intervention typologies. Hospital building evolution is one of the most studied topics in the planning field, as it is strictly connected to the destination of health care and the change and progress of health care systems. In fact, history has witnessed a typological change, shifting from a planimetric scheme mainly based on pavilions to one based on a single block, or other hybrid solutions. The case studies analyzed, in detail, present two typologies: the monoblock, characterized

by a compact structure, and the pavilion, divided into several buildings not connected among them.

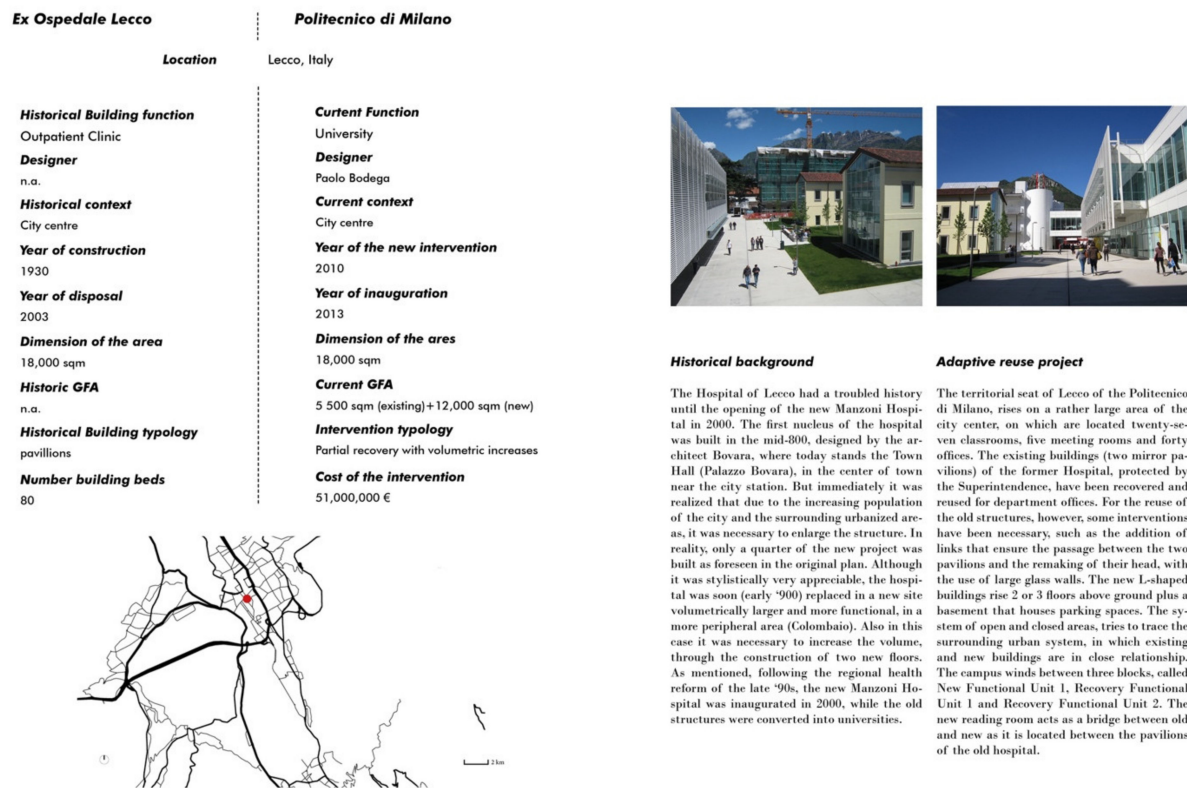


Figure 3. Fact-sheet of case study analysis [43]. Figure designed by the authors; the images are from the website of Politecnico di Milano and the map is based on Google Maps.

In the list of criteria used to describe each case study, the intervention typology has been investigated: the choice of adaptive reuse adopted by the designer of the recovery, which can be conservative or partially conservative (e.g., total preservation of the building and/or the addition of new volumes).

Moreover, the years of realization and disposal of a building allow for understanding architectural style (or styles), the possible criticalities and potentialities, and if it can be included among the protected goods.

No less important is the economic issue, which highlights the costs of recovery and reuse of historical assets, thanks to which it is possible to estimate the cost per square meter of each case study proposed.

Figure 3 shows one of the fact-sheets developed to analyze the set of case studies, on the left side, informative data have been presented by underlying the differences among historical and current characteristics of the building, while on the right side, it is possible to appreciate a more detailed description.

Once all the case studies have been analyzed by considering the criteria elicited, it has been possible to give rise to a comparative analysis to understand possible trends and guidelines to support the definition of the most suitable adaptive reuse function.

Table 1 synthesizes all the data collected with historical information presented in black and current information in red.

Table 1. Comparative analysis [38–56]. Table structured by the authors (in black historical information, in red the current information).

Hospital	Location	Historical Function/Current Function	Designer	Historical Context/Current Context	Year of Construction/Disposal	Year New Intervention/Inauguration	Historical Dimension of the Areas/Current	Historic GFA/Current GFA	Building Typology	N° Of Beds	Intervention Typology	Cost of the Intervention (EUR)
ex ospedale Vighi	Parma, Italy	multi-specialist/hotel	Enrico Bovio/Giandebuggi	peripheral/city centre	1926/2010	2010/2013	10000 sqm/10000 sqm	6800 sqm/6800 sqm	monoblock	n.a.	conservative recovery	3,500,000
ex ospedale degli Innocenti	Florence, Italy	multi-specialist/museum	Filippo Brunelleschi/Ipostudio	city centre/city centre	1445/1890	2010/2016	6000 sqm/6000 sqm	5200 sqm/5200 sqm	monoblock	250–300	conservative recovery	12,800,000
ex ospedale San Marco	Venice, Italy	tuberculosis/hotel	n.a./Matteo Thun CZstudio	Sacca Sessola Island	1936/1979	2010/2016	160,000 sqm/160,000 sqm	32,000 sqm/32,000 sqm	pavillions	300–450	partially conservative recovery	120,000,000
ex ospedale Lecco	Lecco, Italy	multi-specialist/university	n.a./Paolo Bodega	city centre/city centre	1930/2003	2010/2013	18,000 sqm/18,000 sqm	n.a./5500 sqm (existing) + 12,000 (new)	pavillions	80	recovery with volumetric increases	51,000,000
ex ospedale Morgagni	Forli, Italy	tuberculosis/hotel	Giovanni Tempioni/Lamberti Rossi	city centre/city centre	1916/1973	2010/2016	90,000 sqm/90,000 sqm	23,000 sqm/22,600 sqm (existing) + 13,000 (new)	pavillions	n.a.	recovery with volumetric increases	28,000,000
ex ospedale Militare	Catanzaro, Italy	military hospital/offices	n.a./Corvino + Multari	peripheral/city centre	1850/second half '900	2010/under contract	5000 sqm/5000 sqm	6200 sqm/6237 sqm	monoblock	n.a.	conservative recovery	9,000,000
ex ospedale al Mare	Venice, Italy	tuberculosis/hotel	several designers/Piva+Rosselli	Lido of Venice	1933/2003	2017/under contract	140,000 sqm/140,000 sqm	n.a./40,000 sqm	pavillions	around 1400	partially conservative recovery	132,000,000
ex ospedale Psichiatrico	Novara, Italy	psychiatric/offices	Lucca/Cobolli Gigli	peripheral/city centre	1875/1978	2005/2007	170,000 sqm/170,000 sqm	n.a./14,000 sqm	pavillions	around 2000	partially conservative recovery	56,000,000
ex ospedale Militare	Toronto, Canada	military hospital/university	Smith&Gemmel/NADAAA	peripheral/city centre	1875/1972	2013/2018	9000 sqm/9000 sqm	n.a./6500 sqm	polyblock	n.a.	recovery with volumetric increases	63,000,000
Cook County Hospital	Chicago, USA	multi-specialist/hotel + mix functions	County, Gerhardt/SOM	city centre/city centre	1834/2002	2018/under construction	12,000 sqm/12,000 sqm	15,000 sqm/15,000 sqm	polyblock	470	partially conservative recovery	153,000,000
Richardson Olmsted Complex	Buffalo, USA	multi-specialist/hotel	Henry Hobson Richardson/Deborah Berke	peripheral/peripheral	1870/2002	2014/2016	380,000 sqm/380,000 sqm	n.a./18,000 sqm	pavillions	n.a.	recovery with volumetric increases	90,000,000
Hôtel-Dieu	Lyon, France	multi-specialist/hotel + mix functions	several designers/Costantin+Nuel	city centre/city centre	1710/2010	2014/2018	20,000 sqm/20,000 sqm	51,000 sqm/51,000 sqm	polyblock	500	partially conservative recovery	250,000,000

4. Results and Discussion

The comparative analysis previously developed allows to detect possible correlations between the different criteria that have been analyzed and systematized.

Regarding the relationship between the historical building typology and intervention typology, it is possible to recognize mainly three typologies: tuberculosis, multi-specialty/military, and psychiatric hospitals.

It is not possible to underline trends or similarities among the previous and current functions. However, most tuberculosis hospitals currently host private services (e.g., hotels), while most multi-specialty/military ones offer public services (e.g., universities and museums). Psychiatric hospitals host in equal part private and public services [56].

Moving the attention to the building's location, and if its proximity to the city center could influence its function [57], it is possible to detect a strong connection with the historical function but not with the current one. In fact, the only hospitals to be built in the suburbs are tuberculosis and psychiatric sites. The reasons are rather obvious: in fact, their function was to ensure adequate care for tuberculosis patients, allowing them to breathe clean air and enjoy maximum sunlight [2]. There are many other European examples of sanatoriums built in mountainous areas or near the sea, but in both cases, they are characterized by large openings and large terraces oriented towards the south-east [58]. Psychiatric hospitals were also primarily located in peripheral areas, although for social rather than medical reasons [59].

The study of hospital building typologies provides insight into the planimetric development of the analyzed case studies concerning the current functions that they are required to respond to. By looking at their plans, it can be observed that all of them have a horizontal development, and their building typology can be divided into monoblock (compact building typology), polyblock (several buildings connected), and pavilions (several buildings separated from each other) [27]. Looking specifically at the relationship between their current functions and their floor plan, the four monoblock structures have different functions (university, hotel, offices, and museum), the two polyblocks have been reused as universities and hotels with a functional mix, and the previous pavilion hospitals have mostly been transformed into facilities for hospitality.

The links between the various topics covered uncover valid relational data to hypothesize possible uses of abandoned health facilities. The case studies treated, though limited in number, have provided data and correlations. In addition, they show a close relationship between the type of intervention and the cost of recovery. This correlation has emerged mainly through the gross floor area (GFA) cost per square meter. Table 1 shows a higher cost for interventions that provide volumetric increases, while costs tend to be lower for totally or partially recovered structures.

Although each former hospital has unique intrinsic and extrinsic features, their recovery and reuse have shown common concepts. Initially, three types of historical functions were defined: tuberculosis, the multi-specialty and military, and the psychiatric ones. Their closure and subsequent abandonment caused urban and social degradation problems because, in most cases, their activities had a great value not only considering the well-being but also economic and social ones for the entire community. Thus, their abandonment has transformed them from care spaces to non-places, deprived of their function and historical memory [17,60]. Their reactivation has become an open issue that has been debated in some cases for years by the various local administrations that have tried to promote the reuse by dialoguing with other public bodies or private subjects. The previous estimation of the costs per square meter has shown that the economic availability is greater when interventions involve private subjects. This relation results in one of the most interesting among these studied: a more significant investment can result in more economic income for the entire system. In addition, the most evident relationship is the one that compares the current function and the relationship between the surface of the area and the covered surface.

Some functions seem to prioritize a more excellent ratio of uncovered to covered area. Whether located in peripheral or central areas, hotels and universities have shown a high free space area. This ratio is directly related to the historical building typology. In fact, the pavilion buildings were realized on large areas (mainly located in the peripheries of the consolidated urban fabric) while the other typologies, monoblock and polyblock, were located in central or semi-central areas. On the other hand, the type of intervention and current function is closely correlated with recovery costs, confirming the importance of sustainable adaptive reuse and the need for constant maintenance to preserve the degradation of the property.

Table 2 summarizes the different levels of relationship, divided into high, medium, and low, which allows to synthesize and clarify what has been described. In the decision-making phase, although a series of different variables can have an important role (geographical location, available budget, or territorial vocations), the summary table of the correlation can be a helpful tool to understand if the hypothesis of adaptive reuse may be suitable in respect to the building under evaluation [36].

Some of the correlations are related to historical characteristics of the buildings while others can be read as consequences of the decision taken. In fact, the original layout strongly affects the possible adaptive reuse functions while the interventions proposed have direct impacts on sustained costs. Usually, private developers are more inclined to face a higher risk in the investment that corresponds to a higher return [61]. According to the cases analyzed and from examining the real-estate market, the most profitable functions are private ones, such as hotels, offices, etc., which correspond to the functions proposed by private actors.

Figure 4 represents a first attempt to support DMs in taking a decision about the adaptive reuse of healthcare facilities or at least to show the outcomes of existing case studies. On the left side of the graph, the criteria analyzed for each building are presented with the different options, while on the right side the new functions identified are listed. According to the location, the typology, the ratio between GFA and covered surface area, the intervention typology, and the possible cost, several suitable alternatives of adaptive reuse could be selected.

Starting from Figure 4 and the work by Scalone (2020) [36], the best practices, subdivided into the common public and private facilities, have been listed in Table 3.

According to the investigation, in the example of universities as reuse functions, it is suggested for the building to be located in the city center, to be organized in pavilions, and usually it is necessary to perform a partially conservatory intervention of recovery with an approximate cost estimation in between 800 and 3000 EUR/sqm [36]. For the museum, also in this case, it should be in a central location with a monoblock typology. The recovery intervention could be conservative and cost the same as the previous function. The most expensive cost estimations per sqm are related to the private functions, i.e., hotel or hotel with a mix of functions. In fact, their restoration concerns also the addition of other buildings, i.e., volumetric increase, but they could be located in peripheral contexts and organized in polyblock.

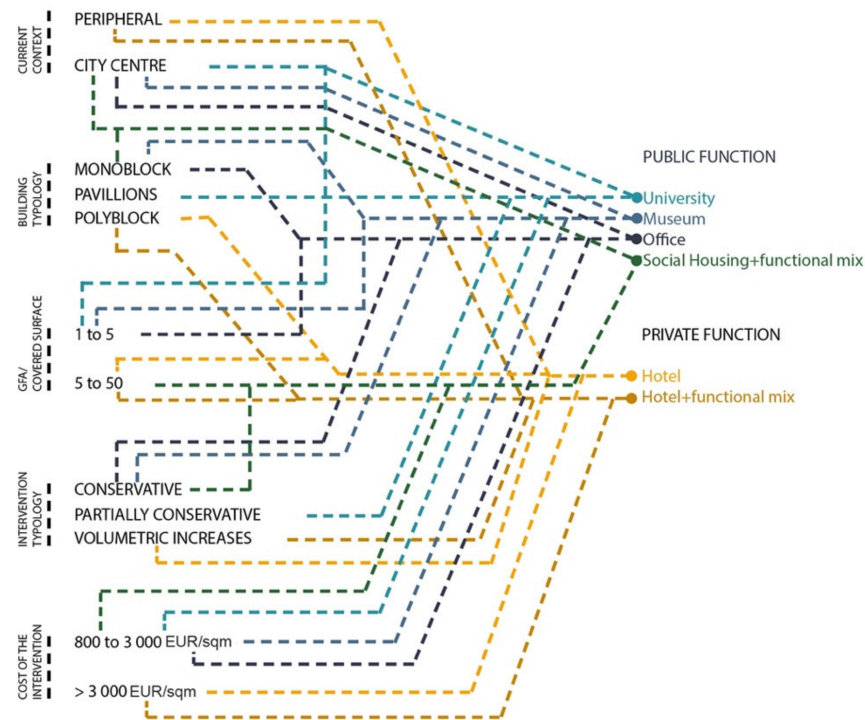


Figure 4. Adaptive reuse strategies [36]. Image designed by the authors.

Table 3. Best practices subdivided into the common public and private facilities [36]. Table structured by the authors.

	University	Museum	Office	Hotel	Hotel with Urban Services
Localization	City center	City center	City center	Suburbs	Suburbs
Building typology	Polyblock	Monoblock	Monoblock	Pavilion	Pavilion
GFA/covered surface area	From 1 to 5	From 1 to 5	From 1 to 5	From 5 to 50	From 5 to 50
Type of intervention	Partially conservative	Conservative	Conservative	With possible volumetric increases	With possible volumetric increases
Intervention costs	Up to 3000 EUR/sqm	Up to 3000 EUR/sqm	Up to 3000 EUR/sqm	More than 3000 EUR/sqm	More than 3000 EUR/sqm
Reference	Ex ospedale Morgagni	Ex ospedale degli Innocenti	Ex ospedale degli Militare in Catanzaro	Ex Richardson Olmsted Complex	Hôtel-Dieu

According to the results obtained, it is clear the strong correlation between the recovery intervention and the cost estimations but what could be better underlined is the adaptive reuse decision that is strongly influenced not only from the location of the building but from its typology. In fact, the internal organization of the spaces has a huge impact on the future function to be hosted. The monoblock typically corresponds to the subdivision of the different functions in the various floors and this layout matches the common organization of public and cultural buildings such as museums. Conversely, the arrangement in pavilions allow for better separate spaces, functions, and levels of privacy. This layout aligns with the need of a university campus given by its necessity to have several classes, administration offices, cafeteria, etc. To conclude, the polyblock, a model that includes a small number of grouped and connected buildings, gives the possibility to easily reach all the floors and buildings while providing an appropriate level of privacy, features that perfectly match the

organization of offices or hotel. If the building is already suitable to host a new function without too many construction changes to the layout, the final cost and time of the overall intervention will have a lower impact compared to a complete recovery work.

These preliminary outputs can be expanded with the investigation of other case studies. It has been stated by Robert K. Yin (2003): *“multiple-case designs may be preferred over single-case designs. Even if you can only do a two-case case study, your chances of doing a good case study will be better than using a single-case design. Single-case designs are vulnerable [. . .]. More important, the analytic benefits from having two (or more) cases may be substantial”* [32]. Moreover, since the final purpose is to do a “generalizing” and not a “particularizing” analysis, these first conclusions serve as a starting point for creating guidelines useful in finding satisfactory trade-offs among all the involved dimensions, and in investigating the relation between cost and benefits of a new intervention.

5. Conclusions

Although the number of case studies is limited, the research work carried out highlights how the recovery and reuse of abandoned buildings is an emerging issue, beginning from several successful experiences. For this reason, local administrations are promoting several policies to incentivize actions aimed at enhancing the building heritage and, more generally, urban regeneration. To improve this scope, it is necessary to involve citizens, who can become a useful instrument in the decision-making process [62,63], helping to make truly desired choices in the public domain for the whole community.

The regeneration of hospital facilities is also linked to the issue of safeguarding the heritage of historical real estate. Their dimensions, although they vary for each case study, have been an opportunity or a great limitation. Despite the desire to regenerate them, public or private actors have clashed with resulting high recovery and management costs [64,65].

The analysis of the case studies has determined a series of correlations useful for tracing possible models of regeneration of abandoned hospital structures.

The collaboration between public and private subjects shows that, if certain conditions arise, it becomes a useful tool for the efficiency of the recovery and reuse process given the potentiality of Public–Private Partnership (PPP) [66]. However, public institutions should accompany the development of project proposals, in order to avoid the implementation of policies contrary to a sustainable transformation process [13].

The analytical study has also allowed to compare design aspects, which have shown different design approaches and the heterogeneous cultural and stylistic forms. Despite the expressive differences, the analysis highlights a common will to preserve the historical memory and identity even when removing the socio-sanitary functional trace.

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References

1. Stevan, C.; Capolongo, S.; Lapi, R. Modelli organizzativi e strutturali. I nuovi ospedali: Esperienze a confronto. Ospedali in rete e servizi di pronto soccorso. In *IV Congress in Organization, Hygiene and Hospital Technique*; Congress Abstract Book: Grado, Italy, 2006; pp. 9–11.
2. Attali, J. *Life and Death of Medicine*, 1st ed.; Feltrinelli: Milan, Italy, 1980.
3. Astley, P.; Capolongo, S.; Gola, M.; Tartaglia, A. Operative and design adaptability in healthcare facilities. *Technè* **2015**, *9*, 162–170. [[CrossRef](#)]
4. Capolongo, S.; Mauri, M.; Peretti, G.; Pollo, R.; Tognolo, C. Facilities for Territorial Medicine: The experiences of Piedmont and Lombardy Regions. *Technè* **2015**, *9*, 230–236. [[CrossRef](#)]
5. Nickl-Weller, C.; Nickl, H. *Healing Architecture*, 1st ed.; Braun: Berlin, Germany, 2013.
6. Mauri, M. The future of the hospital and the structures of the NHS. *Technè* **2015**, *9*, 27–34. [[CrossRef](#)]
7. McCartney, G.; Douglas, M.; Taulbut, M.; Katikireddi, S.V.; McKee, M. Tackling population health challenges as we build back from the pandemic. *BMJ* **2021**, *3757*, n608. [[CrossRef](#)] [[PubMed](#)]
8. Ricciardi, W.; Tarricone, R. The evolution of the Italian National Health Service. *Lancet* **2021**, *398*, 2193–2206. [[CrossRef](#)]
9. Clark, C.M. Reuse of historic naval hospitals. *WIT Trans. Ecol. Environ.* **2010**, *129*, 457–459. [[CrossRef](#)]
10. Pachilova, R.; Sailer, K. Size and complexity of hospitals matter for quality of care: A spatial classification of NHS buildings. In *Proceedings of the SSS 2015—10th International Space Syntax Symposium*, London, UK, 13–17 July 2015.
11. Franco, E. Medicine and art: Places, technology and care. *Recenti Progress. Med.* **2019**, *110*, 439–440.
12. Capolongo, S. *Flexibility in Healthcare*, 1st ed.; Franco Angeli: Milan, Italy, 2012.
13. Vandesande, A.; Balen, K.; Della Torre, S.; Cardoso, F. Preventive and planned conservation as a new management approach for built heritage: From a physical health check to empowering communities and activating (lost) traditions for local sustainable development. *J. Cult. Herit. Manag. Sustain. Dev.* **2018**, *8*, 78–81. [[CrossRef](#)]
14. Della Torre, S. Italian perspective on the planned preventive conservation of architectural heritage. *Front. Archit. Res.* **2021**, *10*, 108–116. [[CrossRef](#)]
15. Italian Legislative Decree 42/2004. Code of Cultural Heritage and Landscape. Referring to Article 10 of the Law 6 July 2002, n. 137. p. 42. Available online: <https://whc.unesco.org/document/155711> (accessed on 9 April 2022).
16. Elrod, J.K.; Fortenberry, J.L., Jr. Adaptive reuse in the healthcare industry: Repurposing abandoned buildings to serve medical missions. *BMC Health Serv. Res.* **2017**, *1711*, 451. [[CrossRef](#)]
17. Fabi, V.; Vettori, M.P.; Faroldi, E. Adaptive reuse practices and sustainable urban development: Perspectives of innovation for European historic spa towns. *Sustainability* **2021**, *13*, 5531. [[CrossRef](#)]
18. Silvana, S.; Fitri, I. Designing adaptive reuse strategy for the ex-Deli Tobacco hospital in Medan, North Sumatra. *IOP Conf. Ser. Earth Environ. Sci.* **2021**, *780*, 0120682020. [[CrossRef](#)]
19. Sdino, L.; Brambilla, A.; Dell’Ovo, M.; Sdino, B.; Capolongo, S. Hospital construction cost affecting their lifecycle: An Italian overview. *Healthcare* **2021**, *9*, 888. [[CrossRef](#)] [[PubMed](#)]
20. Vehbi, B.O.; Günçe, K.; Iranmanesh, A. Multi-criteria assessment for defining compatible new use: Old administrative hospital, Kyrenia, Cyprus. *Sustainability* **2021**, *13*, 1922. [[CrossRef](#)]
21. Elrod, J.K.; Fortenberry, J.L., Jr. Advancing indigent healthcare services through adaptive reuse: Repurposing abandoned buildings as medical clinics for disadvantaged populations. *BMC Health Serv. Res.* **2017**, *1713*, 805. [[CrossRef](#)]
22. De Ance, R.P. *Urban Transformations and the Architecture of Additions*, 1st ed.; Routledge: London, UK, 2014.
23. Oppio, A.; Dell’Ovo, M. Cultural heritage preservation and territorial attractiveness: A spatial multidimensional evaluation approach. In *Cycling & Walking for Regional Development*, 1st ed.; Pileri, P., Moscarelli, R., Eds.; Research for Development, Springer: Cham, Switzerland, 2021; pp. 105–125. [[CrossRef](#)]
24. Rossitti, M.; Oppio, A.; Torrieri, F. The Financial Sustainability of Cultural Heritage Reuse Projects: An Integrated Approach for the Historical Rural Landscape. *Sustainability* **2021**, *13*, 13130. [[CrossRef](#)]
25. Vigotti, F. Rural landscape heritage in the inner areas as repository of culture. In *Smart Innovation, Systems and Technologies, Proceedings of the 4th International Symposium on New Metropolitan Perspectives, NMP 2020, Reggio Calabria, Italy, 26–28 May 2020*; Springer: Cham, Switzerland, 2020; Volume 178, p. 178. [[CrossRef](#)]
26. Australian Government—Department of Environment and Heritage. 2004. Available online: <https://www.awe.gov.au/sites/default/files/documents/adaptive-reuse.pdf> (accessed on 31 October 2020).
27. Capolongo, S.; Sdino, L.; Dell’Ovo, M.; Moioli, R.; Della Torre, S. How to Assess Urban Regeneration Proposals by Considering Conflicting Values. *Sustainability* **2019**, *11*, 3877. [[CrossRef](#)]
28. Faroldi, E.; Fabi, V.; Vettori, M.P.; Gola, M.; Brambilla, A.; Capolongo, S. Health tourism and thermal heritage. Assessing Italian Spas with innovative multidisciplinary tools. *Tour. Anal.* **2019**, *24*, 405–419. [[CrossRef](#)]
29. ISTAT, 3/2013. Available online: https://www.istat.it/it/files/2013/03/9_Paesaggio-e-patrimonio-cult.pdf (accessed on 31 October 2020).
30. Centis, L.; Micelli, E. Regenerating Places outside the Metropolis. A Reading of Three Global Art-Related Processes and Development Trajectories. *Sustainability* **2021**, *13*, 12359. [[CrossRef](#)]
31. Stival, C.A.; Berto, R.; Morano, P.; Rosato, P. Reuse of Vernacular Architecture in Minor Alpine Settlements: A Multi-Attribute Model for Sustainability Appraisal. *Sustainability* **2020**, *12*, 6562. [[CrossRef](#)]

32. Yin, R.K. *Case Study Research: Design and Method*, 1st ed.; SAGE: New York, NY, USA, 2003.
33. Lipset, S.M.; Trow, M.; Coleman, J. *Union Democracy*, 1st ed.; Free Press: New York, NY, USA, 1956.
34. Dell'Ovo, M.; Bassani, S.; Stefanina, G.; Oppio, A. Memories at risk. How to support decisions about abandoned industrial heritage regeneration. *Valori Valutazioni* **2020**, *24*, 107–115.
35. Dell'Ovo, M.; Dell'Anna, F.; Simonelli, R.; Sdino, L. Enhancing the cultural heritage through adaptive reuse. A multicriteria approach to evaluate the Castello Visconteo in Cusago (Italy). *Sustainability* **2020**, *13*, 4440. [CrossRef]
36. Scalone, S. Recovery and Reuse of Healthcare Structures. Master Thesis, Politecnico di Milano, Milano, Italy, 31 October 2020.
37. Gola, M.; Brambilla, A.; Barach, P.; Signorelli, C.; Capolongo, S. Educational Challenges in Healthcare Design: Training Multidisciplinary Professionals for Future Hospitals and Healthcare. *Ann. Ig.* **2020**, *32*, 549–566. [CrossRef]
38. VV. AA. L'Ospedale di Inizio '900. Servizio Sanitario Regionale Emilia Romagna. Azienda Ospedaliero-Universitaria di Parma. Available online: <https://www.ao.pr.it/chi-siamo/storia/lospedale-di-inizio-900/> (accessed on 31 December 2021).
39. VV. AA. Riuso in Albergo di Lusso ex Ospedale G. Vighi. The Plan. 2015. Available online: <https://www.theplan.it/architettura/riuso-in-albergo-di-lusso-ex-ospedale-gvighi> (accessed on 31 December 2021).
40. Maggioni, G.; Maggioni, A.; Papazian, O. The Innocents Hospital of Florence. *Int. Pediatrics* **1998**, *13*, 57–59.
41. Franzoia, E. Ipostudio fa Rivivere lo Spedale Degli Innocenti. *Abitare*. 2016. Available online: https://www.abitare.it/it/architettura/progetti/2016/10/18/ipostudio-spedale-degli-innocenti/?refresh_ce-cp (accessed on 31 December 2021).
42. Thun, M. JW Marriott Venice Resort & Spa. The Plan. 2017. Available online: <https://www.theplan.it/architettura/jw-marriott-venice-resort-spa-it> (accessed on 31 December 2021).
43. VV. AA. Campus a Lecco. Domus Web. 2015. Available online: https://www.domusweb.it/it/architettura/2015/03/16/campus-universitario_a_lecco.html (accessed on 31 December 2021).
44. VV. AA. Campus a Forlì. Domus Web. 2015. Available online: https://www.domusweb.it/it/notizie/2015/07/04/campus-universitario_di_forli.html (accessed on 31 December 2021).
45. Angelillo, I.F.; Ricciardi, G.; Nante, N.; Boccia, A.; Bianco, A.; La Torre, G.; Vinci, V.; De Giusti, M. Appropriateness of hospital utilisation in Italy. *Public Health* **2000**, *114*, 9–14. [CrossRef]
46. VV. AA. Nuova Sede Della Procura Della Repubblica Nell'ex Ospedale Militare di Catanzaro. The Plan. 2019. Available online: <https://www.theplan.it/award-2019-renovation/nuova-sede-della-procura-della-repubblica-nell-ex-ospedale-militare-di-catanzaro-1> (accessed on 31 December 2021).
47. Fantera, F. Venezia Lido, l'Ospedale a Mare Ospiterà un Resort e l'Italian Hotel School. The Brief City. 2019. Available online: <http://www.ppan.it/stories/lido-ospedale-resort/> (accessed on 31 December 2021).
48. Evangelista, G. Spazi Della Follia/2: Recuperi Virtuosi. Il Giornale dell'Architettura.com. 2018. Available online: <https://ilgiornaledellarchitettura.com/2018/05/15/spazi-della-follia-2-recuperi-virtuosi/> (accessed on 31 December 2021).
49. VV. AA. Ospedale Psichiatrico di Novara. SIUSA. Available online: <https://siusa.archivi.beniculturali.it/cgi-bin/pagina.pl?TipoPag=prodente&Chiave=428&RicProgetto=carte> (accessed on 31 December 2021).
50. Pintus, P. Daniels Building at University of Toronto/NADAAA. ArchDaily. Available online: https://www.archdaily.com/916301/daniels-building-at-university-of-toronto-nadaaa?ad_medium=gallery (accessed on 31 December 2021).
51. De Vise, P. Cook County Hospital: Bulwark of Chicago's apartheid health system and prototype of the nation's public hospitals. *Antipode* **1971**, *3*, 9. [CrossRef]
52. Blasius, E. Historic Cook County Hospital Restoration and Redevelopment Breaks Ground in Chicago. ArchPaper. 2018. Available online: <https://www.archpaper.com/2018/06/cook-county-hospital-restoration-redevelopment/> (accessed on 31 December 2021).
53. VV. AA. The Long History of a Distinguished National Landmark. The Richardson Olmsted Campus. Available online: <https://richardson-olmsted.com/learn/history/> (accessed on 31 December 2021).
54. Bel, J.-C.; Feireisen, M.; Fessy, M.-H.; Broussolle, C.; Neidhardt, J.-P.H.; Ferrandis, J.-J. The daily life of patients at the Hôtel-Dieu in Lyon in the nineteenth century. *Hist. Des Sci. Médicales* **2015**, *49*, 197–208.
55. VV. AA. 800 Year Old Hospital Reconverted into a Hotel in Lyon. Artchitectours. Available online: <https://www.artchitectours.com/800-year-old-hospital-reconverted-into-a-hotel-in-lyon/> (accessed on 30 December 2021).
56. Delanoë-Vieux, C.; Coirié, M.; Bouhallier, G.; Fontaine, C.; Salabay, B. Perray-Vaucluse. The history of a repurposed hôpital. *Inf. Psychiatr.* **2021**, *97*, 63–69. [CrossRef]
57. Caprioli, C.; Bottero, M. Addressing complex challenges in transformations and planning: A fuzzy spatial multicriteria analysis for identifying suitable locations for urban infrastructures. *Land Use Policy* **2021**, *102*, 105147. [CrossRef]
58. Tostoes, A.; Ferreira, Z. Adaptive Reuse: The Modern Movement towards the Future. In Proceedings of the 14th International Docomomo Conference, Lisbon, Portugal, 6–9 September 2016.
59. Plantamura, F.; Capolongo, S.; Oberti, I. Built environment and wellbeing in Italian psychiatric wards. *World Hosp. Health Serv.* **2015**, *51*, 36–39.
60. Cerreta, M.; Elefante, A.; La Rocca, L. A creative living lab for the adaptive reuse of the Morticelli church: The small project. *Sustainability* **2020**, *12*, 10561. [CrossRef]
61. Del Giudice, V.; Passeri, A.; De Paola, P.; Torrieri, F. Estimation of risk-return for real estate investments by applying Ellwood's model and real options analysis: An application to the residential real estate market of Naples. *Appl. Mech. Mater.* **2014**, *651–653*, 1570–1575. [CrossRef]

62. Gola, M.; Buffoli, M.; Rebecchi, A.; Fior, M.; Daprà, F.; Vettori, M.P.; Capolongo, S. Improving sport spaces into urban areas for healthy and inclusive communities: The case of Milan. *Eur. J. Public Health* **2021**, *31* (Suppl. 3), ckab165.222. [[CrossRef](#)]
63. Arnstein, S.R. A ladder of citizen participation. *J. Am. Inst. Plan.* **1969**, *35*, 216–224. [[CrossRef](#)]
64. Oppio, A.; Torrieri, F.; Dell’Oca, E. Land value in urban development agreements: Methodological perspectives and operational recommendations. *Valori Valutazioni* **2018**, *21*, 87–95.
65. Rossitti, M.; Torrieri, F. Circular economy as ‘catalyst’ for resilience in inner areas. *Sustain. Mediterr. Constr.* **2021**, *5*, 64–67.
66. Oppio, A.; Dell’Ovo, M.; Torrieri, F.; Miebs, G.; Kadziński, M. Understanding the drivers of Urban Development Agreements with the rough set approach and robust decision rules. *Land Use Policy* **2020**, *96*, 104678. [[CrossRef](#)]