sustainability

MDPI

*Article*

# Multi-Criteria Assessment for Defining Compatible New Use: Old Administrative Hospital, Kyrenia, Cyprus

**Beser Oktay Vehbi [1,*], Kağan Günçe [2] and Aminreza Iranmanesh [3]**

[1] Department of Architecture, Eastern Mediterranean University, Famagusta 99628, North Cyprus, Mersin 10, Turkey
[2] Department of Interior Architecture, Eastern Mediterranean University, Famagusta 99628, North Cyprus, Mersin 10, Turkey; kagan.gunce@emu.edu.tr
[3] Faculty of Architecture, Near East University, Nicosia 99138, North Cyprus, Mersin 10, Turkey; aminreza.iranmanesh@neu.edu.tr
* Correspondence: beser.oktay@emu.edu.tr; Tel.: +90-3926301346

**Abstract:** It is common for the original use of heritage buildings to become obsolete which in some cases can result in them becoming vacant and subject to deterioration. Adaptive reuse is an essential policy for achieving sustainability as it keeps a continuous building life cycle and avoids building destruction. It is one approach to sustainability where it retains the tangible and intangible values, resilience of the original building materials, and reduces waste and time. The decision-making criteria for compatible new use includes several criteria that affect sustainable development: economic, environment, social, legislative, and architecture. Several Multi-Criteria Decision Making (MCDM) methods have been established in order to aid the process of cultural heritage preservation. This research aims to present an assessment model to support the establishment of appropriate new use by employing an Analytic Hierarchy Process (AHP). The decision-making software used was Expert Choice 11. The administrative hospital in Kyrenia, Cyprus, was selected as the case study in this research. Using the application of AHP with the participation of different stakeholders (experts and locals), a more compatible use as a community centre is proposed and supported by the research methodology.

**Keywords:** compatible use; historic building; multiple selection criteria; decision-making; AHP



**Citation:** Vehbi, B.O.; Günçe, K.; Iranmanesh, A. Multi-Criteria Assessment for Defining Compatible New Use: Old Administrative Hospital, Kyrenia, Cyprus. *Sustainability* **2021**, *13*, 1922. https://doi.org/10.3390/su13041922

Academic Editor: Isabella M. Lami
Received: 4 January 2021
Accepted: 3 February 2021
Published: 10 February 2021



## 1. Introduction

The cultural heritage of cities is the main driver of development, they are especially subjects for possible transformations. It can be relatively divided into movable or immovable heritage [1]. Cultural heritage can be used as a potential element for achieving sustainable environment since it can redefine, sustain, and reproduce itself through adaptive reuse.

From this perspective, adaptive reuse can play a decisive role not only in terms of increasing the life cycle of the heritage but also as a sustainable urban strategy that provides economic, aesthetic, cultural, educational, and political values. Adaptive reuse is not only providing physical improvement, it also provides social and economic benefits to the context and the building itself [2]. Besides, extending and improving the life of the cultural heritage through adaptive reuse entails less use of money, energy, waste, and time that makes a substantial support to sustainability [3].

Adaptive re-use is defined as a new use-finding process for a building, as "developing new uses for the economically viable old buildings with structural use potential" and can be seen as a component of the rehabilitation process [4]. With the adaptation to a new function, the building will continue to be used and bring new life to the building [5].

Defining a suitable function is the most crucial part of adaptive reuse projects. In the process of adaptation, respect for the authenticity of the building and its suitability for

contemporary uses are accepted as an indicator of success. UNESCO defines adaptive reuse as discovering new suitable activities that respect form, character, structure and historic integrity and often entail alterations to a place [6].

According to ICOMOS, successful built heritage adaptive reuse projects are those that "modify a place for a compatible use while retaining its cultural heritage value" [7]. The most successful adaptive reuse projects add a contemporary layer that provides value for the future and also respect and retain a building's heritage significance [8].

The heritage values are important issues in adaptive reuse projects since the new function should be compatible with them [9,10]. The starting point for choosing the suitable new activity in the adaptation projects is accordingly represented by the intrinsic value. Respecting the intrinsic values can contribute to determining the relevant alternatives for cultural heritage and accordingly new function meets the needs of society and, at the same time, minimizing the negative impacts on the urban context [9]. Besides, successful adaptive reuse projects should retain economic feasibility of the heritage place and explain the investment expenses of the building works and other costs relating to the proposed use, including maintenance costs, the potential market value, and the financial implications of the proposed reuse [11–13].

The ultimate aim of conservation in general and adaptive reuse in particular is not to conserve material for its own sake, but rather to maintain and refine the values embodied by the heritage—with physical intervention or treatment being one of many means toward that end [14]. According to the studies, the conservation proposals need to be based on the determination of all values in historic monuments [15–17]. The main problem in adaptive reuse projects is ignorance of these heritage values or putting one or two of them into consideration and not seeing them all important. In this regard, the values as represented in objects or place are the determinant factor in shaping all conservation [18,19]. It could be argued that proceeding successful adaptive reuse projects is a complex process that needs to respect and preserve the existing values; furthermore, the physical and spatial character of the building and the potentials of the context need to be considered [8]. Therefore, the aforementioned criteria have to be taken into consideration during the decision-making process of reuse.

Most of the adaptive reuse projects lack participatory processes that include different stakeholders. However, heritage conservation should support the ideas and expectations of the community since the community is the generator of heritage. Protecting and respecting the values, spirit of place together with community, and physical characteristics of the building are the main criteria that need to be considered all together to bring heritage for the future generations. Accordingly, this holistic strategy would help to follow the route of sustainability by providing positive attributes to socio-economic, environmental, and cultural matters. It is clear that adaptive reuse requires the consideration and evaluation of many criteria in order to achieve sustainable practice in the end.

This research aims to introduce and adopt an appropriate decision-making tool to support the efficiency in selecting the ideal solution by utilising the view of different stakeholders—locals and experts. The old hospital building is used as an example for this study. The legal conservation status of the building is listed by the Antiquities Department and therefore registered as cultural property owned by the government.

The hospital building is located in the northeast part of Kyrenia city centre in Northern Cyprus. It was built in 1891 and extended in 1893 [20]. The area was developed during the British period and includes a number of public, civic, and administrative buildings such as the central post office, the court building, lawyer offices, public prosecution building, veterinary department, fire station, Kyrenia election board building, fire station, telecommunication building, and hospital (Figure 1). The municipality building and retail and leisure activities are mainly placed closer to the centre of the town. Most of the office buildings were located along Mustafa Cagatay Street. During the British period, the town expanded eastwards in part due to land availability.

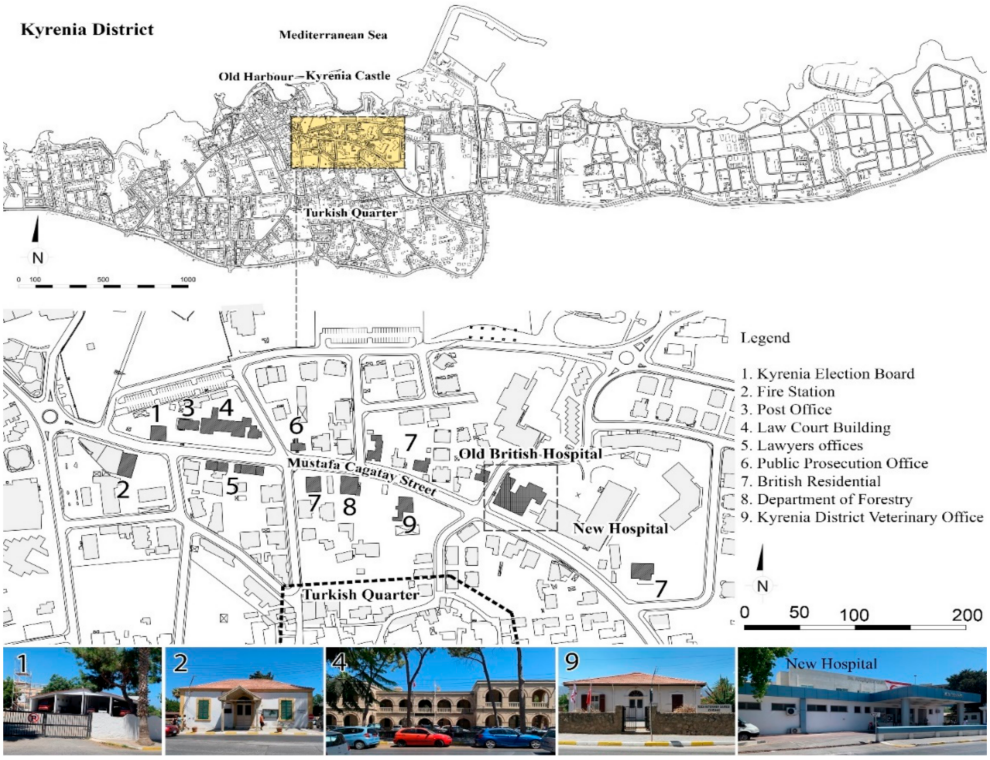


**Figure 1.** Location of the building in Kyrenia (photos by Beser Oktay Vehbi).

Due to the increase in population and the subsequent need for more capacity, the old British hospital became redundant in 1996 and has been left without any proper function. A new contemporary hospital building was constructed next to the original building and this is what currently serves the town. The old British building had been partially adapted for use by some non-governmental organizations (NGOs) such as a sanitary office (one room of the building used by them), the Cyprus Turkish Crescent (two rooms are used for this activity), and the Cancer Charity Trust unit (one room is used for this purpose); nevertheless, these functions are not enough to integrate the building into the city life.

In order to make the old building a part of today's contemporary life, there is an urgent need to carry out a conservation study for adaptive reuse. The reusing of vacant architectural heritage could not only help to improve the aesthetic, physical appearance of the building, and its setting, but also it could provide a positive economic and socio-cultural dimension [21].

On the basis of our study, the building is considered appropriate for re-use for the following reasons:

- It is a characteristic example of British colonial architecture;
- It has a clear identity that is recognisable to the local population;
- The building is mostly vacant, thus allowing the assignation of a new programme.

A sensitive and robust analysis of the heritage building helped to determine the best alternatives and the weighting of each criteria for measuring the performance of each alternative in the decision-making process.

Nowadays, decision makers have become gradually mindful of sustainability and initiated to include all environmental, economic, social, and cultural criteria in their decision-making methods to achieve longstanding development. These dimensions of sustainability are also related to both the tangible and intangible characteristics of the building and its context. These multi-criteria call for a complicated decision-making process with input from a range of stakeholders. Within this context, the research uses the Multi-Criteria Decision Making (MCDM), which includes the participation of different stakeholders for establishing compatible functions for heritage buildings.

The study compromises six sections. This part provides a backdrop to the research. The second section gives the theoretical background about reuse and the factors for the adaptive reuse of heritage buildings. These factors will be used to provide the multi-criteria list in the decision-making process. The third section introduces MCDM and the fourth part explains the methodologies used in the research and site survey. The application of the Analytic Hierarchy Process (AHP) on the case study building is given in the fifth section. The conclusion is given in the sixth section of the study.

## 2. Literature Review

In many countries, much of the built cultural heritage is now derelict, underused, or considered for functions that are not compatible with historical, social, and cultural values. Adaptive reuse is the practice of converting abandoned, outdated, or unsuccessful buildings into new uses [22–27]. Adaptive reuse is generally associated with building conservation and offers a "new life" to the building, in addition to maintaining national heritage [6]. Reuse is a method that is frequently used to protect structures that have a documentary value that speaks of the period they belong to, and reflects the social, cultural, and economic accumulation of the society. Over time, the function becomes obsolete both technologically and socio-culturally. In its simplest terms, it can be defined as making the building suitable for new needs with renovations.

Researchers emphasise the importance of compatibility of the new use with the spatial and physical characteristics of heritage buildings [28]. Adaptive reuse needs to consider the location of the building, the state of conservation, the setting in which the building is placed, the community's ties to the place, and the economic outcome of the investment [29–31]. It is obvious that with the decision for a compatible alternative, there is a need to consider not only physical, aesthetic, and spatial character, but also the social and cultural values of the original building [32,33].

Factors such as location, the potential market, the architectural and historical evaluation of the building, and a full physical analysis are all important considerations [12,34,35]. For the Architectural Institute of Japan [36], a building's historic significance, its cultural, artistic, and technological value, its picturesque/contextual value, the environmental impact, and its social value are all suggested as criteria in the process of successful reuse projects. As stated by Bullen and Love [37]: "the most successful developed heritage adaptive reuse projects are those that respect and retain the building's heritage significance and add a contemporary layer that provides value for the future." Elsewhere, commercial performance (measured by project costs and employee productivity), building demand and function, cost factors of reuse, the risk associated with reuse, operational attributes, and sustainability are identified as well [38].

Some scholars also identified criteria such as cultural, economic [5,39], architectural [39–41], environmental [5,39,42], social aspects [5,39] and continuity for the reuse of historic buildings [39]. Similarly, a previous study identifies criteria such as cultural, economic, architectural, environmental, social, and continuity aspects [43]. For the city of Toronto, the criteria used in the adaptive reuse of buildings that form part of their industrial heritage are environmental, location, legislative, financial, and market characteristics [43]. Another study identified that environmental, physical, functional, economic, political, social, and cultural factors contribute to the success of adaptive reuse strategies for heritage buildings [44].

As seen from these previous studies, there are multiple selection criteria that are involved through the decision-making process in the adaptive reuse of historic buildings. Accordingly, there are some common criteria identified by all of the above commentators, and these could be summarised as physical, economic, social, cultural, and environmental.

### *Multi-Criteria Decision Making Methods for Built Heritage*

The use of immovable cultural heritage for contemporary purposes is a complex design process that involves multiple criteria values. MCDM can help to consolidate this

broad range of considerations [45]. It provides a more transparent and efficient selection process among design alternatives [34,46,47].

MCDM approaches have been commonly used in various distinctive areas in the fields of environmental project management, tourism management, energy, engineering, sustainability, and heritage conservation. Since the methods have several interconnected aspects and conditions, the advantages and effectiveness of these methods are clear. The majority of MCDM methods mainly include three common aspects [48]:

- Determining the alternatives and criteria: According to the main aim/goal of the project, there is a need to identify alternatives for the selection and the criteria for decision making;
- The relative weighting of the criteria: it is important to define the extent to which the criteria impacts the final choice by identifying the relationship between the criteria and the objectives;
- An evaluation of the alternatives against the stated criteria: The alternatives can be ranked.

There are various scientific works presented in the literature that practice the application of MCDM methods in cultural heritage decision problems [34,49–52]. MCDM for cultural heritage can be useful for the evaluation process of historic building adaptive reuse [34,47,52,53], the planning and reconstruction of a historic building, grading historic centre and buildings [46,54], cultural heritage conservation, and for measuring the extent to which the project meets the social needs of the population.

The most commonly used criteria for selecting appropriate new uses for heritage buildings are [1,28,34,52,53,55–58]:

- Cultural criteria (historical value, artistic value, conditions of integrity, originality).
- Economic criteria (financial possibilities, subsidize, investments, profit margins, benefits of exemption).
- Architectural criteria (building's physical condition, architectural features, technological value, materials and decorations of the building, by-laws and codes).
- Environmental criteria (location, scenic/contextual value and environmental effect, regional development policies, potential environmental quality of surroundings).
- Technological criteria (project preparation and coordination, construction work duration, building lifetime, possibilities of building adaptation to current needs).
- Social criteria (suitable with public interest reuse, social value, increasing public awareness, enhancing the role of communities).
- Continuity criteria (adequate protection and management systems, feasibility of future change, ecological and cultural sustainability).

The AHP, the Analytic Network Process (ANP), and Fuzzy Delphi methods are the three most commonly used MCDM within the field. Experts' knowledge is also used for the determination of cultural heritage value and the selection of compatible alternatives for its conservation or refurbishment [45].

According to the existing body of literature, the application of MCDM methods may be seen in the ecosystems valuation of cultural heritage and spatial planning and energy planning, but there are very few references regarding its application in the field of cultural heritage [28,32,49,52].

In this study, AHP method helps to solve complex problems with the help of experts and locals. It is used for determining the most suitable new function for the Old Hospital in Kyrenia, Cyprus, considered to be an important piece of cultural heritage.

## 3. Materials and Methods

### *3.1. Methodology for Selecting a Compatible Function for the Old Hospital Building*

The methodology for this study comprises two main phases:

- The first phase is including a field survey, literature review, and questionnaire survey that help to determine the reuse alternatives and criteria;

- The second phase is the application of AHP approach for the final selection of the reuse alternatives.

### *3.2. Literature Review, Field and Questionnaire Surveys*

A field survey was carried out to gather data such as location, historical background, legal status, physical condition, problems, photographs, and scaled sketch plans, sections, and elevations of the hospital building. In order to established cultural significance, a historical survey was carried out by examining written sources, maps, and studying old photographs. The sources dated back to the British period and include the works of local authors and newspapers. In addition, former employers such as nurses, doctors, and other staff were interviewed.

Resulting from this survey, land-use and locational character of the building and its surrounding, construction period and date, and the state of conservation were recorded together with a scaled sketch plan and façade drawings. The locational and architectural characteristics as well as historical values of the building will help the decision makers to assign the most relevant reuse proposals.

Additionally, literature review on the potential criteria for adaptive reuse was completed and noted that many scholars had made contributions on this [5,59–62] in the second step. The main criteria for this project were identified as cultural, economic, architectural, environmental, social, and legal.

Next, a questionnaire survey was done in order to select five suitable alternative functions out of the 10 that had been long-listed with the help of local people who were all originally from Kyrenia and all over 40 years old. It is considered that people over 40 years old often had strong relations and memories with the old hospital building that was built during the times of the British administration of Cyprus, but lost its original function in 1996. They were also able to comment on the strengths and weaknesses of the building and its surroundings.

A questionnaire with 110 local people was completed during June 2020 in Kyrenia. This concluded that out of 10 possible uses, the following 5 were considered to be the most appropriate: community centre, museum, educational building, health, and administration; this data was incorporated into the AHP as the fourth step of the methodology.

### *3.3. Analytical Hierarchy Process (AHP)*

AHP is defined as "analytical" due to its ability to configure a multi-criteria decision making problem into basic fundamental components [10,63–65]. It is also defined as "hierarchical" because it permits the multifaceted problem to be broken down into easier sub-problems [10,48]. In other words, AHP can help decision makers to understand and see the relationship between the main goal of the problem, criteria, sub-criteria, and alternatives in a hierarchical structure [48,63,66,67]. In this method, priorities are determined through paired comparisons, the problem is simplified by breaking its components into smaller tangible sets of evaluations. This approach is the general phase of AHS that was originally stated by Saaty [68]. In the following section, the phases of the AHP are explained.

#### 3.3.1. Defining the Problem

For this study, the goal is determined as "defining the most suitable alternative for reusing the hospital building" and criteria for defining the most suitable function for the historic building are determined from the literature review. Besides, the alternatives are collected from the questionnaire survey with locals. Accordingly, the phases of creating AHP started (Figure 2).

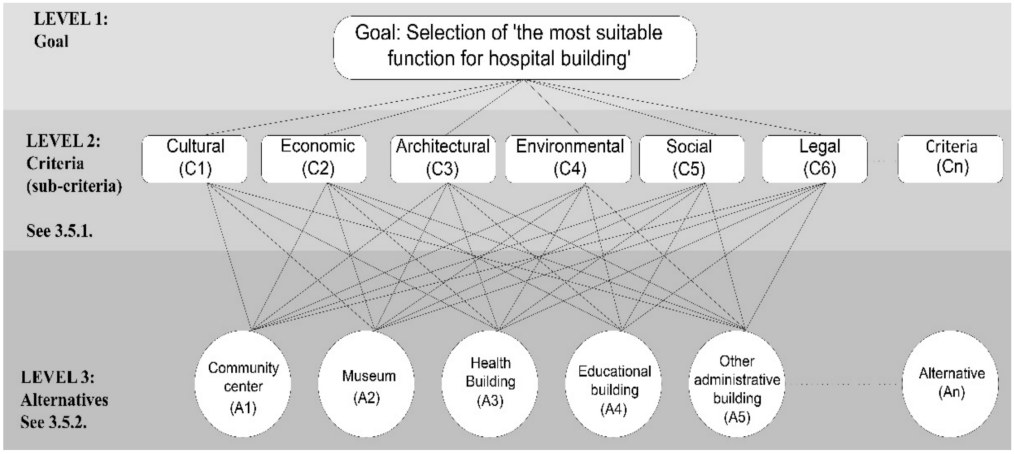


**Figure 2.** A hierarchy of Analytic Hierarchy Process (AHP) (developed by authors).

### 3.3.2. Creating the Pairwise Comparisons

At this stage, all the items—criteria and alternatives—are placed in the hierarchy.

Once the hierarchical framework is created, the participants—10 experts who have knowledge and experience of adaptive reuse and conservation work and 10 locals who are familiar with the buildings in and around Kyrenia—are asked to provide a pairwise matrix at each level of the hierarchy and then compare each component with the other by exercising the fundamental scale for the pairwise comparisons shown in Figure 1. This nine-point scale developed by Saaty [69] has been accepted by most experts as a scientific and rational basis for comparing two alternatives (Table 1).

**Table 1.** Saaty's Judgment Scale [65,69].

| Numeric Scale | Description | Definition |
|---|---|---|
| 1 | Two activities contribute equally to the objective | Equal |
| 3 | Experience and judgement slightly favour one activity over another | Slight |
| 5 | Experience and judgement moderately favour one activity over another | Moderate |
| 7 | An activity is favoured very strongly over another; its dominance demonstrated in practice | Strong |
| 9 | The evidence favouring one activity over another is of the highest possible order of affirmation | Extreme |

Pairwise comparison of the alternatives and the criteria were placed in Expert Choice 11 program and the hierarchy model is formed (for more information see [70]).

### 3.3.3. Making the Consistency Analysis

The consistency ratio (CR) is measured by calculating whether the interaction determined in pairwise comparison is consistent or not. CR is a control measure for checking the potential internal inconsistencies in the dataset.

The consistency index is found from the formula;

$$CI(A) = \lambda max - n/n - 1$$

CI: Consistency Index
λmax: maximum eigenvalue in the matrix,
n: Number of elements

The consistency ratio is obtained by dividing the consistency index (CI) into the Random Consistency Index (RI);

$$CR = CI/RI$$

and if this value is less than 0.10, it can be said that pairwise comparisons are consistent.

#### 3.3.4. Creating the Decision Matrix

This is the final step of AHP which shows the relationship between two factors [71]. Among all alternatives, the one which has the highest score (importance) is the most suitable alternative [72].

In the following sections, the application of the model on the case study is pretested.

### *3.4. Application of the Model to the Case Study*

The successful adaptive reuse decision-making requires a thorough analysis of the heritage building's values, locational, physical characteristics, spatial characteristics, and analysis of its environment. The following sections introduce the relevant information regarding the case study.

#### 3.4.1. Locational and Architectural Character of the Building

The hospital building is located on a flat, corner site and surrounded by two streets. To the south is Mustafa Cagatay main road with a width of 15 m, and to the north, Karakız road with a width of 7 m. The area of the site is about 10,750 $ft^2$ (1000 $m^2$) and is almost square.

The study area contains a range of different uses. To the east are governmental district offices and to the west administrative buildings. South of the hospital is the Turkish Quarter, which is mainly a residential area with some commercial uses. To the north and northwest of the hospital is Kyrenia castle, the open-air municipal open-air theatre and a residential neighbourhood (see Figure 2). Accordingly, we concluded that it would be beneficial to incorporate uses that served the surrounding administrative and residential areas.

The building has a U-shaped plan and consists of two storeys with multiple spaces internally. The main building materials are local dressed stone and timber and clay tiles on a pitched roof. The ground floor was used for doctors' clinics, accident and emergency, laboratories, pharmacy, and a kitchen and restrooms for patients. The first floor was used for operating theatres, patients' rooms, doctors' offices, and staff wardrobes (Figure 3).

The locally quarried natural stone that was widely used as a building material in Cyprus is a yellow cut calcarenites stone (42 cm thick with plaster), used for external and internal walls and the colonnaded arcade on the ground and first floors. It has a pitched roof and traditional tiles. There are two entrances, the main entrance being on the south.

According to the field survey and observations, the building does not have any structural damage but is functionally and physically obsolete. The main damage is to the timber and plaster which are in a state of decay. Since the building is located close to the Mediterranean Sea, the rear façade facing the sea towards the north has been subjected to salt erosion.

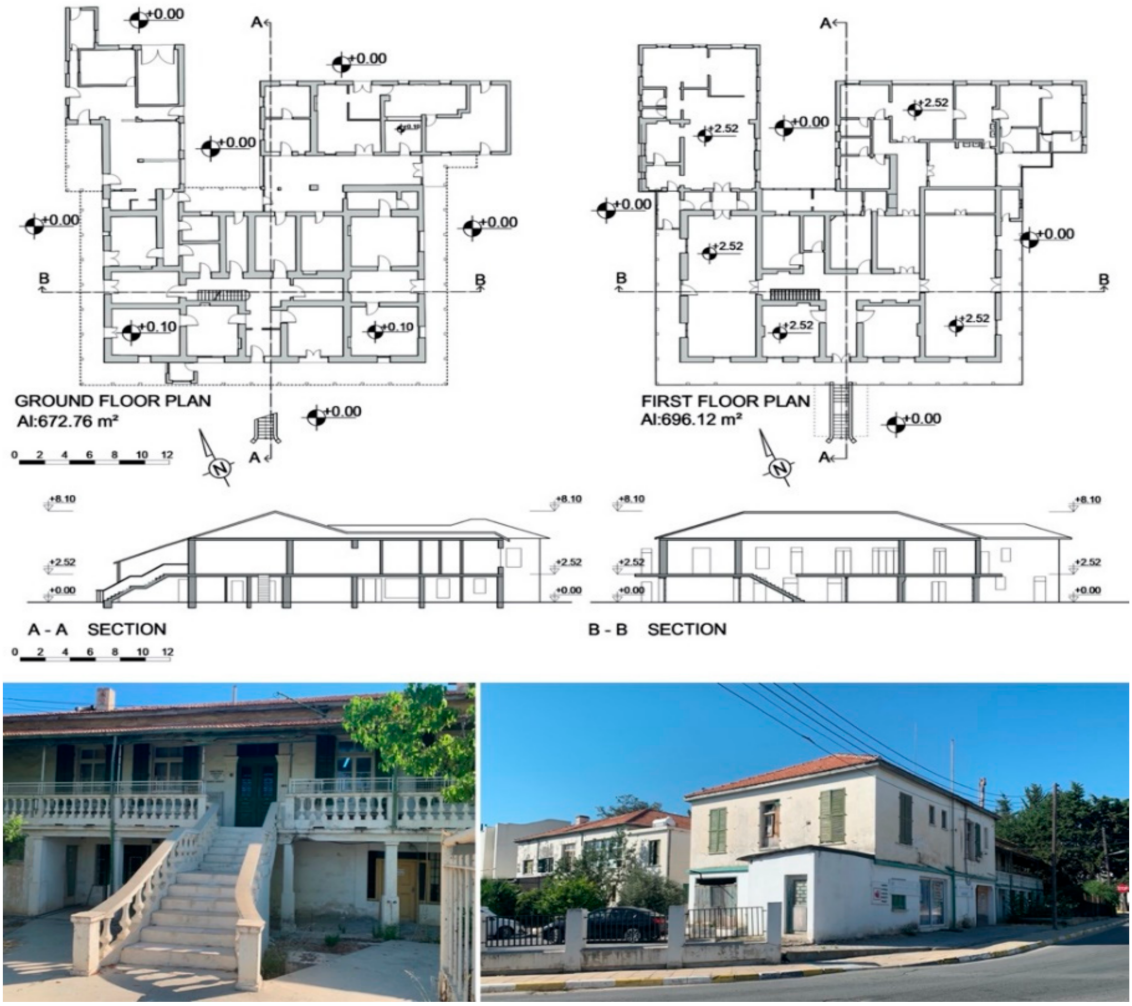


**Figure 3.** Plans, sections, and photos of the building (photos by Beser Oktay Vehbi).

3.4.2. Values of the Building

The British hospital building is a significant structure; it represents the lived experiences of the local population, historic character of the context, physical, and socio-cultural aspects of the city. In this sense, cultural heritage values of the hospital building can be evaluated as:

- Historical value;
- Architectural and spatial values;
- Social and memory values.

When the historical values of the hospital are examined, the characteristics of the building that reflect the traces of the past are an important feature in this context. The hospital gives information in the context of the construction system, material property, social structure, and socio-cultural characteristics of the period it belongs to. It contains many more values in the sense of historical value.

The hospital structure carries considerable values in terms of architectural qualities. It is possible to see the British colonial building style—two floors with arcaded terraces and pitched roof in its formation. These assets can be handled in an architectural and spatial context. In terms of spatial organization, the repetitive small rooms and having a U-shaped plan helps to bring light into most of the inner spaces. In the sense of spatial value, the spatial arrangement of the structure and the interrelationships between the spaces in this arrangement are some of the important features constituting the cultural heritage value.

It is clearly understood that the hospital is an important construction in terms of architectonic qualities, especially when looking at the façade, huge and nicely designed staircases through the first-floor terrace and entrance where the doctors, surgery, and patients' rooms were located. On the other hand, the interior of the building is designed to have small, repetitive rooms that help to run the health activities. Evaluating cultural heritage values with only tangible parameters is not sufficient in terms of analysing the characteristics of the hospital. Accordingly, the socially useful purpose of the health-care building provides social benefit for a long time, not only for Kyrenians but also for the villagers around the city. Therefore, locals have a strong bond with the building even nowadays (many of them were born in the building, most doctors worked here). These social and memory value of the building together with the aforementioned values will contribute to a better understanding and protection of the structure and help to achieve an accurate decision-making process.

### *3.5. Implementation of Multi-Criteria Methods to the Case Study*

#### 3.5.1. Determination of Criteria

The main objective of the research is to develop a method that helps the decision-making process in identifying an appropriate function for the building. Since different criteria are considered to achieve sustainable reuse and determine the most suitable function for the building, a thorough literature review was carried out [5,40,59,60,62]. Table 2 identifies the criteria to be used in finding a suitable new use for the building.

**Table 2.** Criteria for the reuse selection.

| Description of Criteria | Sub Criteria |
| --- | --- |
| C1: Cultural | Historical value<br>Artistic value<br>Condition relating to integrity and authenticity |
| C2: Economic | Financial sources,<br>Initial investment and necessary investment in future maintenance<br>Profitability<br>Market Potential |
| C3: Architectural | Physical condition of the building<br>Architectural character and form<br>Space usage and gains<br>Structural analysis<br>Conditions of materials and decoration |
| C4: Environmental | Contextual value and environmental effect<br>Regional development policies<br>Potential of the surrounding |
| C5: Social | Compatibility of newly proposed functionswith existing,<br>Public interest<br>Social value<br>Increasing public awareness<br>Enhancing the role of communities (involvement) |
| C6: Legal | Adequate conservation and management system,<br>Future change feasibility<br>Ecological and cultural sustainability |

#### 3.5.2. Selection of the Alternative functions for the Hospital Building

A questionnaire survey with 110 locals was used to obtain the preferred five functions out of 10 for the case building. As stated earlier, the respondents of the questionnaire are permanent residents who are over 40 years old (they already had some memories about

the building). The respondents gave their feedback based upon the locational, physical, and spatial character of the building. They were asked if they knew when the building was constructed, its original function, when it was used as a hospital, and if they would consider the building an important heritage asset within its setting. The defined alternatives are embedded in the table created in MS Excel format (Figure 4).

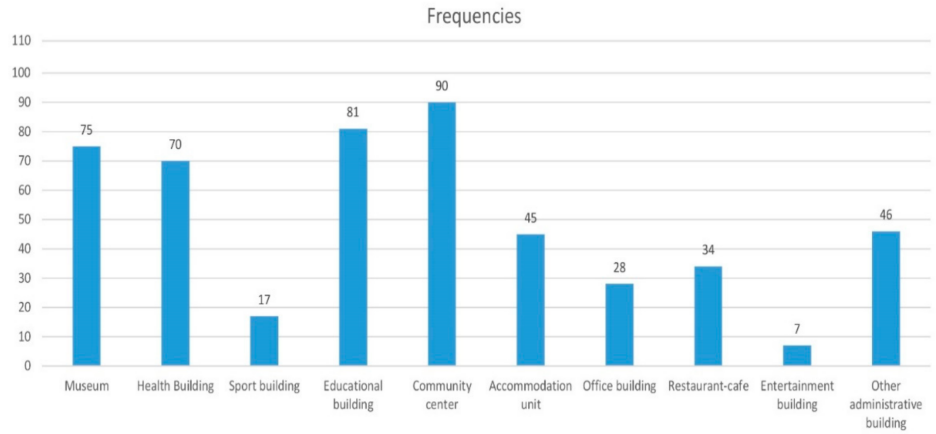


**Figure 4.** Five most preferred alternatives (developed by authors).

According to the result of the questionnaire, the most desirable functions for the building are community centre, museum, educational building, health, and other administrative building.

## 4. Results

After identifying six criteria from the literature and gathering five alternatives from the questionnaire with 110 locals, the authors selected the different stakeholders to determine the most suitable alternatives for the building by using the AHP method. According to Cheng and Li [73], the AHP approach is a subjective methodology that does not necessarily require a large number of experts to participate in the process. Thus, two different teams, 10 experts and 10 locals (some of whom were also experts on cultural heritage conservation), were selected for the decision-making; the experts and locals were responsible for evaluating the criteria with respect to their importance in achieving the overall goal.

The expert team (10 experts) included architects, planners, landscape designers, lecturers on the conservation of heritage sites/buildings, city planning, and municipality staff who are familiar with the area (Table 3). Expert 1 is an architect and has worked in a private firm in Kyrenia for 19 years and deals with the various conservation projects in the city. Expert 2 is an architect with 24 years of working experience in the field and has a private firm in the city. Expert 3 is a professor from the department of architecture in a public university for 15 years, specialized in urban design and cultural heritage conservation, and has worked as a representative of university in the supreme council of Antiquities department for five years. Expert 4 is a professor of the department of architecture of the public university for 18 years, specialized in conservation, and has published many articles on this subject. Expert 5 is an associate professor of the architecture department for 19 years and specialized in architectural theory and history. Expert 6 is an architect working as an officer in the Antiquities Department for 18 years and specializes in conservation and restoration of heritage sites and giving consultancy for conservation projects. Expert 7 is a general manager of the engineering company and has 16 years of professional experience in various fields including urban planning and conservation. Expert 8 is an associate professor in a private university and urban planner with 16 years of working experience and gives consultancy to the municipality for its planning, traffic, and landscaping projects in the city. He is one of the members of Chambers of City Planners. Expert 9 is a landscape architect and has worked in a municipality for 17 years. Expert 10 is an architect specialized

on regional planning and design for 18 years and a member of the public works and zoning committee in the municipality.

**Table 3.** List of experts.

| | Field | Occupation | Years in the Field |
|---|---|---|---|
| No 1 | Architecture | Working as an architect in a private firm in Kyrenia | 19 |
| No 2 | Architecture | Working as an architect in a private firm in Kyrenia | 24 |
| No 3 | Academic expert on cultural heritage conservation | Professor—Academic expert | 15 |
| No 4 | Academic expert on cultural heritage conservation | Associate professor—Academic expert | 18 |
| No 5 | Academic expert on architectural history | Associate professor—Academic expert | 19 |
| No 6 | Conservation | Working in the Antiquities Department | 18 |
| No 7 | Engineer | Working as a conservator in a private office | 16 |
| No 8 | Urban planning | Member of Chambers of City Planners | 15 |
| No 9 | Landscape planning | Members of Landscape design committee in the municipality | 17 |
| No 10 | Regional planning and design | Member of the public works and zoning committee in the municipality | 18 |

People who were born in the city and lived more than 40 years in the city were selected to the local team since the building was abandoned in 1996. People younger than 40 may not have a correct decision on the transformation of the building since they may not have had any chance to use and saving any memory about it. Having different educational and occupational level are considered for selecting this group of people. The final group includes housewives, an architect, doctors, a lawyer, and retired officers from different departments; some were living in the villages and some were at the city centre (Table 4).

**Table 4.** List of locals.

| | Period of Staying at the City—Gender (F/M) | Education Level | Occupation |
|---|---|---|---|
| No 1 | 43—F | University | Bank Officer |
| No 2 | 44—M | High school | Municipality employee |
| No 3 | 52—F | University | Doctor |
| No 4 | 67—F | University | Lawyer |
| No 5 | 67—M | High school | Retired Officer |
| No 6 | 70—F | University | Doctor |
| No 7 | 45—M | University | Architect |
| No 8 | 70—M | High School | Retired officer |
| No 9 | 67—F | Primary School | Housewife |
| No 10 | 66—F | Secondary School | Housewife |

Local 1 is a female bank officer and was born in Kyrenia and has been living in the city for 43 years. She remembers the hospital from her childhood when she was going there with her grandmother for accompanying her. Local 2 is a male officer at Catalkoy Municipality that is a village on the east part of Kyrenia and has been living for 44 years in the city. He was born in that hospital. Local 3 is a female doctor and worked in the hospital

building and has been living 52 years in the city. Local 4 is a lawyer having an office along the street where the hospital is placed and has been living 67 years in Kyrenia. Local 5 is also originally from the city (67 years living period) and had the chance to work at the hospital as an administrative manager. He retired from the hospital. Local 6 is a female doctor, born and still living in the city. She also had worked in the hospital. Local 7 is a male architect and working in a private construction firm in Kyrenia. He has been living in the city for 45 years and had contributed to the renovation project of the new hospital next to the case. Local 8 is a 70-year-old man, living in Zeytinlik village that is 5 km away from the Kyrenia city centre and retired from Kyrenia Antiquities Department. Local 9 is wife of local 8 and has been living for 67 years in the city. Local 10 is a housewife and born in that hospital as her nine siblings.

All the local participants have shared memories about the hospital building such as being born there, getting health services for themselves and their children, working as doctors or officers. The building is found valuable by the locals not for only being an important building from the British period, but also for its social and cultural values to the community.

It is believed that these specificities in locals' occupation and differences in their educational level would provide validation and a higher level of acceptability of their evaluations.

Interviews with experts and locals were conducted face-to-face and lasted roughly within one hour. Meetings were done with each expert and locals individually.

In order to determine the weighting of each criterion in relation to the main goal, the research team established a process of using matrix manipulation based on Saaty's supermatrix and his 1–9 scaling [63]. In order to achieve this scaling with the criteria, 10 experts and 10 locals were asked: "Regarding the adaptive reuse of the historic building, which criteria is more important than the other?"

Similarly, the same group of experts and locals were asked to carry out a pairwise comparison between alternatives. In order to achieve the weight of each alternative, the following question was asked: "Considering the adaptive reuse of hospital building, which alternative is the most suitable?"

The importance and priority of the criteria and the alternatives are obtained through this questionnaire. The results were entered into the "Expert Choice 11" programme to calculate the relative significance and inconsistency rates of the criteria and the alternatives in a hierarchical table.

In the first stage of the programme, the goal was defined as "The most suitable function for hospital building." After defining the goal, the criteria and alternatives are entered into the Expert Choice 11 programme and the values are defined in the pairwise comparison area (Figure 5). In the next stage, the programme developed an analysis of the pairwise comparison matrices. The comparison of the criteria and the alternatives were made and the consistency rate for each pairwise comparison was found. Finally, the most suitable alternative for the determined goal is achieved.

The evaluation of the different stakeholders (experts and locals) can be reached individually or as a group with the use of the Expert Choice 11 programme. In this way, the authors of the study were able to see the relative importance of the criteria at the stage of determining a new function for the hospital building. The results of all participants were obtained separately by the programme. The obtained results are given below.

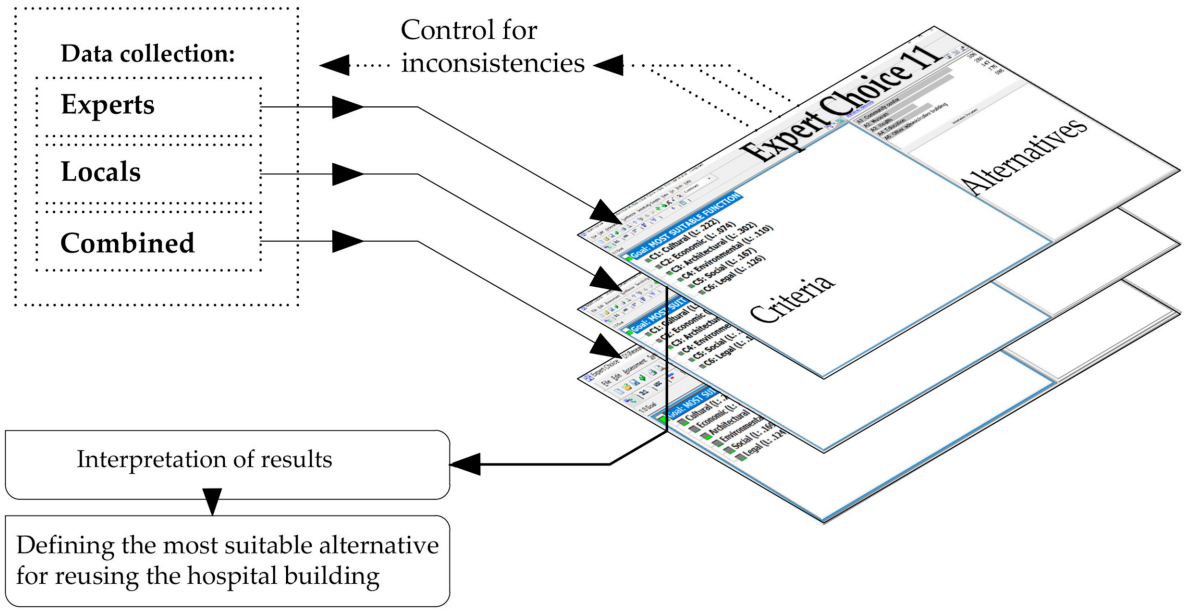


**Figure 5.** Data analysis process using Expert Choice 11 (developed by authors).

### *4.1. Outcome of the Expert Group*

The questionnaire survey with the experts and their results that the Expert Choice 11 programme produced are as follows (Figure 6). Regarding the equal evaluation of the results of the experts, the weight matrices for criteria are as follows: architectural (C3) (30.2%), cultural (C1) (22.2%), social (C5) (16.7%), legal (C6) (12.6%), environmental (C4) (11%), and economic (C2) (7.4%). Since the consistency rate is 0.0074 and it is smaller than 0.10, it is consistent.

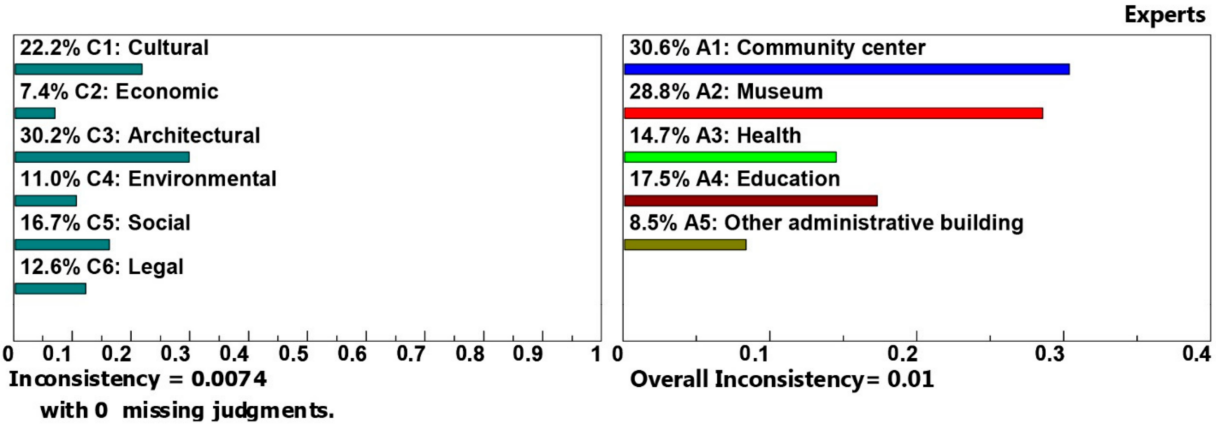


**Figure 6.** Priority of the main criteria and the evaluation of alternatives by experts (developed by authors).

The pairwise comparisons among the alternatives with each criterion were completed and the weight matrices obtained by asking the question, "which alternative is the most suitable to achieve Criteria 1 by Alternative 1 and by how much?" Accordingly, experts ranked the most suitable alternative for the building as a community centre (A1) (30.6%), museum (A2) (28.8%), education (A4) (17.5%), health (A3) (14.7%), and other administrative building (A5) (8.5%). The overall inconsistency stands below the 0.1 threshold at 0.01.

### *4.2. Outcome of the Local Group*

The local survey was completed with 10 people; however, one of the participant's evaluation was deleted from the program due to its high inconsistency rate (0.21) that exceeds the acceptable threshold (0.10). Because of this, the results of the local survey were finalised using 9 participants. The results of the survey with locals show the same priority rates for criteria but slight differences in the rate of alternatives in comparison with experts. Regarding the equal evaluation of the results of the locals, the weight matrices for criteria are C3 (33.1%), C1 (25.9%), C5 (17.0%), C6 (11.9%), C4 (8.2%), and C2 (3.9%) (Figure 7). Since the consistency rate is 0.03, it is considered consistent.

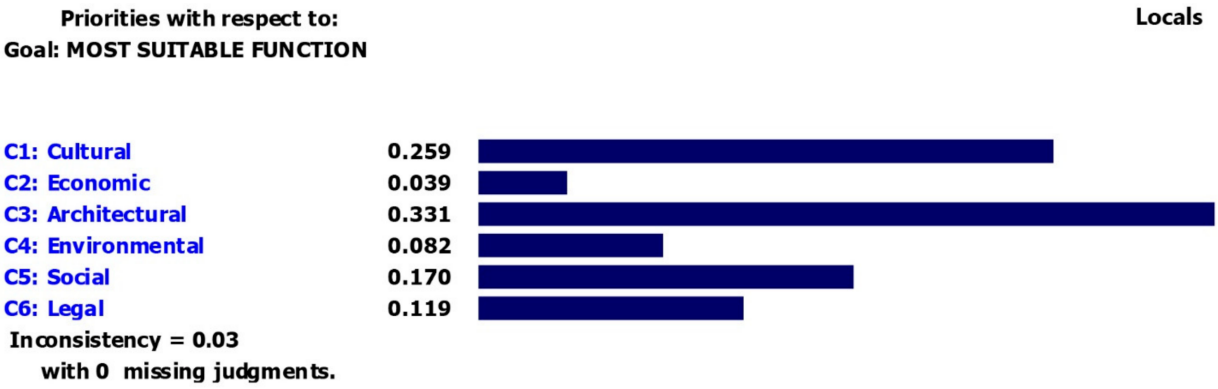


**Figure 7.** Data showing the relative importance of each criterion by locals (developed by authors).

Then, the pairwise comparison among the alternatives with each criterion are completed and the weight matrices obtained. Consequently, locals ranked the most suitable functions for the building as A1 (38.7%), A4 (19.1%), A2 (18.4%), A3 (14.8%), and A5 (9.0%) (Figure 8).

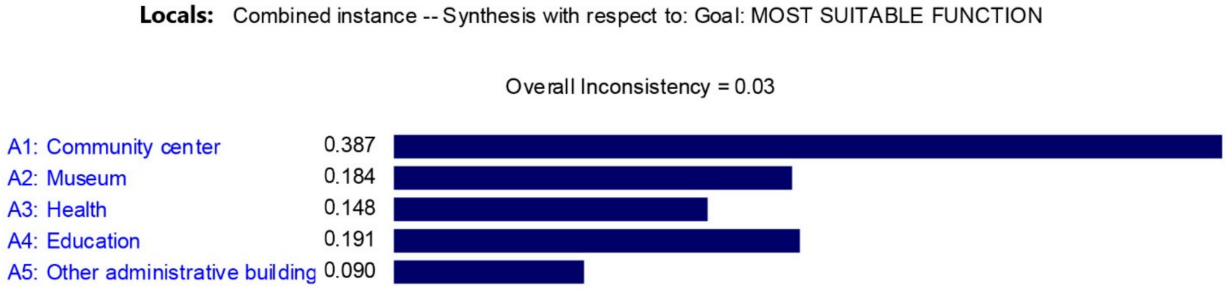


**Figure 8.** Data showing the relative importance of each alternative by locals (developed by authors).

### *4.3. Combined Outcome*

The overall result of the survey with respect to all participants/stakeholders' opinions shows that the criteria that affect the success of the reuse are defined as C3 (31.7%), C1 (24%), C5 (16.9%), C6 (12.4%), C4 (9.6%), and C2 (5.5%) (Figure 9). In the evaluation of the alternatives by considering the priority rates, A1 (34.4%) has been ranked as a most suitable function compared to other alternatives A2 (23.4%), A4 (18.5%), A3 (14.8%), and A5 (8.9%) (see Figure 9).

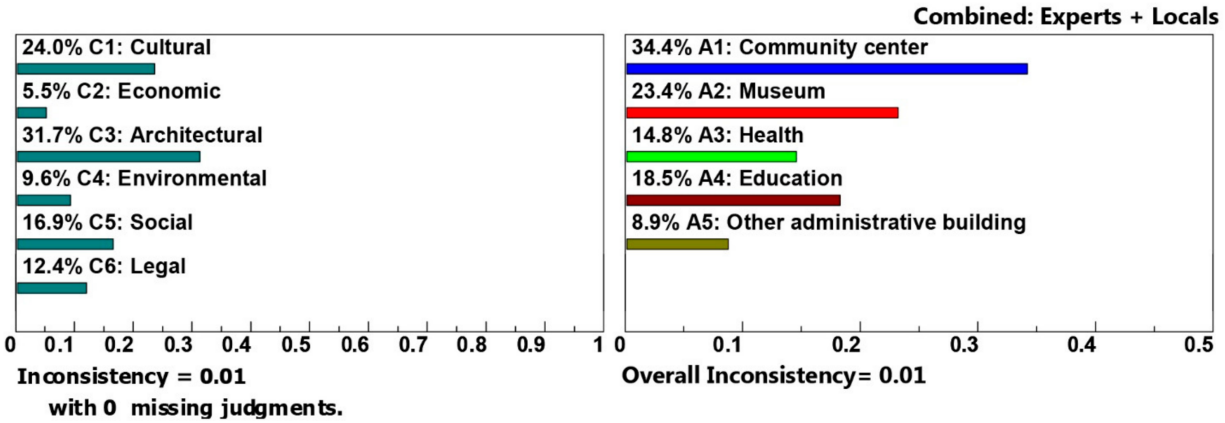


**Figure 9.** Priority of the main criteria and the evaluation of the alternatives by all participants (developed by authors).

The overall evaluation of the survey reveals that different stakeholders can participate in the decision-making process both individually and as a team. The relative priorities of the criteria of the two teams are similar. According to the order in the selection of criteria for both groups, architectural criteria came first, then culture, social, legal, environmental, and economic criteria come in the same order.

The differences come to the forefront between the two groups of respondents—experts and locals—in particular when it came to defining the alternatives. During the decision-making process, the first team's (the experts) ranking is listed as a community centre, museum, education, health, and other administrative building, while in the second team (locals) the results were community centre, education, museum, health and other administrative building. According to this ranking, for both teams, the primary choice is a community centre.

## 5. Conclusions

The main aim of this paper lies in the development of a comprehensive methodology, which integrates different variables selecting the most suitable reuse. The research similarly offers a review of the multi-criteria decision-making process in developing criteria for reuse projects and the involvement of stakeholders in the decision-making process. The proposed AHP-based approach not only leads to a rational outcome but also allows the decision-makers to visualize the impact of each criterion on the final result. Further, it helps to see the relationships among criteria can be defined using the AHP technique, which has rarely been applied in the context of the reuse of historical buildings.

The study tries to underline the importance of the decision-making process that has to include all criteria of adaptive reuse that lead to sustainable development and at the same time compatible function through participation of different stakeholders.

The proposed model eases the complex decisions making process through involving different stakeholders and taking their different point of view into the assessment process. In other words, participation of different stakeholders—experts and locals—helped the study to achieve a more comprehensive proposal for the future the building.

Different than most of the current studies in the literature, this research aims to include the locals in the decision-making process because the participation of the local community is important for the success of this type of process. The involvement of the locals and experts help to understand if they have a common or different solution for the building and to obtain a ranking of the alternatives. Additionally, involving both groups in the process revealed a higher level of acceptability of the result and transparency of the process.

The results of the decision-making process with locals and experts also prove that they consider the values (that are the criteria affecting the success of the adaptive reuse) of the building while they are evaluating the alternatives.

British hospital is a heritage building that has typical British Colonial architectural characteristic in Kyrenia, Cyprus and had an important function when it was constructed. Besides, it is an important historic asset on its location and contributes to the urban identity together with other administrative buildings in the area which all dated from the British period. Since it is partially adapted to some activities and most parts are still vacant, it cannot be integrated with city life and there is a danger of losing urban memory due to its vacancy. So, the current state of the building is not sustainable; therefore, it needs to adapt to a new function. For this to be happen, a multi-criteria decision making method proposed six criteria to assess five different new, alternative functions for the redesign of the case building. These alternatives and criteria were evaluated by a group of experts and locals who elaborated in the decision-making model.

Being a hospital case, it is a rare example of its kind. Using the building for cultural function can be more suitable in terms of preserving its heritage values. Consequently, the "community centre" alternative is the most suitable for the hospital regarding the locals and experts considering the architectural, legal, social, and environmental characters of the building. It is believed that a suggested new use would provide a chance for the community to learn and appreciate historical and architectural features of the building while generating sustainable social and cultural impacts within the surrounding community.

The selection of the criteria could also be done by the experts and may be modified for different buildings to reflect the differences in objectives and the contextual characteristics of these buildings. In addition, the composition of the expert team and the number of experts can be flexible according to different cases. Potential alternatives and specific criteria of reuse selection in historic buildings can be identified by the professional team and locals upon the location and the characteristics of a building. So, the decision-making model of this study can be extended to other contexts and different heritage buildings. It can be used by the architects, urban planners, restoration experts, and engineers in developing strategies for adaptive reuse projects.

**Author Contributions:** Conceptualization, B.O.V. and K.G.; methodology, B.O.V., K.G. and A.I.; software, A.I.; validation, B.O.V., K.G. and A.I.; investigation B.O.V. and K.G.; resources, B.O.V. and K.G.; data curation, B.O.V., K.G. and A.I.; writing—original draft preparation, B.O.V., K.G.; writing—review and editing, B.O.V.; visualization, B.O.V. and A.I.; supervision, B.O.V. and K.G.; project administration, B.O.V.; All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** Not applicable.

**Acknowledgments:** The authors wish to thank Tunc Adanır for his valuable support for the building's drawing.

**Conflicts of Interest:** The authors declare no conflict of interest.

## References

1. Kutut, V.; Zavadskas, E.; Lazauskas, M. Assessment of priority alternatives for preservation of historic buildings using model based on ARAS and AHP methods. *Arch. Civ. Mech. Eng.* **2014**, *14*, 287–294. [CrossRef]
2. Conejos, S.; Langston, C.; Smith, J. Improving the implementation of adaptive reuse strategies for historic buildings. In Proceedings of the Le Vie dei Mercanti SAVE HERITAGE: Safeguard of Architectural, Visual, Environmental Heritage, Naples, Italy, 9–11 June 2011; pp. 1–10.
3. Bullen, P.A.; Love, P.E. Residential regeneration and adaptive reuse: Learning from the experiences of Los Angeles. *Struct. Surv.* **2009**, *27*, 351–360. [CrossRef]
4. Cantell, S.F. *The Adaptive Reuse of Historic Industrial Buildings: Regulation Barriers, Best Practices and Case Studies*; Virginia Polytechnic Institute and State University: Blacksburg, VA, USA, 2005.
5. Langston, C.; Wong, F.K.W.; Hui, E.C.M.; Shen, L.-Y. Strategic assessment of building adaptive reuse opportunities in Hong Kong. *Build. Environ.* **2008**, *43*, 1709–1718. [CrossRef]
6. UNESCO. *Caring for Your Heritage Building: Building Owner's Information*; United Nations Educational, Scientific and Cultural Organization: Paris, France, 2015.

7. ICOMOS. *New Zealand Charter, for the Conservation of Places of Cultural Heritage Value*; ICOMOS: Auckland, New Zealand, 2010.
8. *Adaptive Reuse–Preserving our Past, Building our Future*; Department of the Environment and Heritage, Commonwealth of Australia: Canberra, Australia, 2004.
9. Della Spina, L.; Calabrò, F. Decision support model for conservation, reuse and valorization of the historic cultural heritage. In Proceedings of the Computational Science and Its Applications–ICCSA 2018, Melbourne, VIC, Australia, 2–5 July; Springer: Cham, Switzerland, 2018; pp. 3–17.
10. Calabrò, F.; Della Spina, L. Innovative tools for the effectiveness and efficiency of administrative action of the metropolitan cities: The strategic operational programme. *Adv. Eng. Forum* **2014**, *11*, 3–10. [CrossRef]
11. Larkham, P.J. *Conservation and the City*; Taylor & Francis: New York, NY, USA, 1996.
12. Murtagh, W.J. *Keeping Time: The History and Theory of Preservation in America*; Wiley: Hoboken, NJ, USA, 2005.
13. Engelhardt, R.A.; Unakul, M.H.; Endrina, E. *Asia Conserved: Lessons Learned from the UNESCO Asia-Pacific Heritage awards for Culture Heritage Conservation (2000–2004)*; United Nations Educational, Scientific Cultural Organization: Paris, France, 2007.
14. Mason, R. Assessing values in conservation planning: Methodological issues and choices. *Asses. Values Cult. Herit.* **2002**, *31*, 5–30.
15. Del, M.S.T.T.; Tabrizi, S.K. "A methodological assessment of the importance of physical values in architectural conservation using Shannon entropy method". *J. Cult. Herit.* **2020**, *44*, 135–151. [CrossRef]
16. Buckley, K.; Sullivan, S. Issues in values-based management for indigenous cultural heritage in Australia. *APT Bull. J. Preserv. Tech.* **2014**, *45*, 35–42.
17. Taylor, J.; Cassar, M. Representation and intervention: The symbiotic relationship of conservation and value. *Stud. Conserv.* **2008**, *53*, 7–11. [CrossRef]
18. Riegl, A. The modern cult of monuments: Its essence and its development. In *Historical and Philosophical Issues in the Conservation of Cultural Heritage*; Price, N.S., Jr., M.K.T., Vaccaro, A.M., Eds.; Getty Conservation Institute: Los Angeles, CA, USA, 1996; pp. 69–83.
19. ICOMOS. *Guidelines to the Burra Charter: Cultural Significance*; Australia ICOMOS Inc: Burwood, Austarlia, 1988.
20. Varnava, A. *British Imperialism in Cyprus, 1878–1915: The Inconsequential Possession*; Manchester University Press: Manchester, UK, 2017.
21. Yuceer, H.; Vehbi, B.O. Adaptive reuse of carob warehouses in Northern Cyprus. *Open House Int.* **2014**, *39*, 65. [CrossRef]
22. Altınoluk, Ü. Binaların yeniden kullanımı. *Yapı Endüstri Merkezi Yayınları İstanbul* **1998**, 19–138.
23. Cantacuzino, S. *New Uses for Old Buildings*; Architectural Press: London, UK, 1975; Volume 3.
24. Highfield, D. *Rehabilitation and Re-Use of Old Buildings*; Spon: London, UK, 1987.
25. Ijla, A.; Broström, T. The sustainable viability of adaptive reuse of historic buildings: The experiences of two world heritage old cities; Bethlehem in Palestine and Visby in Sweden. *Int. Inv. J. Arts Soc. Sci.* **2015**, *2*, 52–66.
26. Clark, J.; Wolkenberg, T. *Adaptive Reuse of Industrial Heritage: Opportunities & Challenges*; Heritage Council Victoria: Melbourne, Australia, 2013.
27. Vehbi, B.O.; Yüceer, H.; Hürol, Y. New uses for traditional buildings: The olive oil mills of the Karpas Peninsula, Cyprus. *Hist. Environ. Policy Pract.* **2019**, *10*, 58–82. [CrossRef]
28. Wang, H.-J.; Zeng, Z.-T. A multi-objective decision-making process for reuse selection of historic buildings. *Expert Syst. Appl.* **2010**, *37*, 1241–1249. [CrossRef]
29. Machado, R. Old buildings as palimpsest. Towards a theory of remodeling. *Progres. Archit.* **1976**, *11*, 46–49.
30. Plevoets, B.; Van Cleempoel, K. Adaptive reuse as a strategy towards conservation of cultural heritage: A literature review. *Struct. Stud. Rep. Maint. Herit. Archit. XII* **2011**, *118*, 155–163.
31. Reed, R.G.; Wilkinson, S.J. The business case for incorporating sustainability in office buildings: The adaptive reuse of existing buildings. In Proceedings of the PRRES 2008: Investing in Sustainable Real Estate Environment: Proceedings of the 14th Annual Conference of the Pacific Rim Real Estate Society, Kuala Lumpur, Malaysia, 20–23 January 2008; pp. 1–18.
32. Haroun, H.-A.A.F.; Bakr, A.F.; Hasan, A.E.-S. Multi-criteria decision making for adaptive reuse of heritage buildings: Aziza Fahmy Palace, Alexandria, Egypt. *Alex. Eng. J.* **2019**, *58*, 467–478. [CrossRef]
33. Yildirim, M. Assessment of the decision-making process for re-use of a historical asset: The example of Diyarbakir Hasan Pasha Khan, Turkey. *J. Cult. Herit.* **2012**, *13*, 379–388. [CrossRef]
34. Ribera, F.; Nesticò, A.; Cucco, P.; Maselli, G. A multicriteria approach to identify the highest and best use for historical buildings. *J. Cult. Herit.* **2020**, *41*, 166–177. [CrossRef]
35. Zhou, Y.-l. An application of the AHP in cultural heritage conservation strategy for China. *Can. Soc. Sci.* **2009**, *2*, 16–20. [CrossRef]
36. Architectural Institute of Japan. *Guidelines for Building Assessment, Preservation and Utilization*; Architectural Institute of Japan: Tokio, Japan, 2007.
37. Bullen, P.A.; Love, P.E. Adaptive reuse of heritage buildings. *Struct. Surv.* **2011**, *29*, 411–421. [CrossRef]
38. Bullen, P.A.; Love, P.E. The rhetoric of adaptive reuse or reality of demolition: Views from the field. *Cities* **2010**, *27*, 215–224. [CrossRef]
39. Wang, J.; Nan, J. Conservation and adaptive-reuse of historical industrial building in China in the post-industrial era. *Front. Architect. Civ. Eng. China* **2007**, *1*, 474–480. [CrossRef]
40. Bullen, P.A. Adaptive reuse and sustainability of commercial buildings. *Facilities* **2007**, *25*, 20–31. [CrossRef]
41. Rani, P. The impact of adaptive reusing heritage building as assessed by the indoor air quality case study: UNESCO World heritage site penang. *Proc. Soc. Behav. Sci.* **2015**, *179*, 297–307.

42. Mohamed, N.; Alauddin, K. The criteria for decision making in adaptive reuse towards sustainable development. In Proceedings of the 4th International Building Control Conference 2016 (IBCC 2016), Kuala Lumpur, Malaysia, 7–8 March 2016; MATEC Web of Conferences: London, UK, 2016; p. 00092.
43. Wilson, C. *Adaptive Reuse of Industrial Buildings in Toronto, Ontario: Evaluating Criteria for Determining Building Selection*; Queen's University: Kingston, ON, Canada, 2010.
44. Mısırlısoy, D.; Günçe, K. Adaptive reuse strategies for heritage buildings: A holistic approach. *Sust. Cities Soc.* **2016**, *26*, 91–98. [CrossRef]
45. Morkūnaitė, Ž.; Kalibatas, D.; Kalibatienė, D. A bibliometric data analysis of multi-criteria decision making methods in heritage buildings. *J. Civ. Eng. Manag.* **2019**, *25*, 76–99. [CrossRef]
46. Piñero, I.; San-José, J.T.; Rodríguez, P.; Losáñez, M.M. Multi-criteria decision-making for grading the rehabilitation of heritage sites. Application in the historic center of La Habana. *J. Cult. Herit.* **2017**, *26*, 144–152. [CrossRef]
47. Ferretti, V.; Bottero, M.; Mondini, G. Decision making and cultural heritage: An application of the multi-attribute value theory for the reuse of historical buildings. *J. Cult. Herit.* **2014**, *15*, 644–655. [CrossRef]
48. Yau, Y. Multi-criteria decision making for urban built heritage conservation: Application of the analytic hierarchy process. *J. Build. Appr.* **2009**, *4*, 191–205. [CrossRef]
49. Tan, Y.; Shen, L.-y.; Langston, C. A fuzzy approach for adaptive reuse selection of industrial buildings in Hong Kong. *Int. J. Strat. Prop. Manag.* **2014**, *18*, 66–76. [CrossRef]
50. Giove, S.; Rosato, P.; Breil, M. An application of multicriteria decision making to built heritage. The redevelopment of Venice Arsenale. *J. Multi. Crit. Decis. Anal.* **2010**, *17*, 85–99. [CrossRef]
51. Claver, J.; García-Domínguez, A.; Sebastián, M.A. Decision-making methodologies for reuse of industrial assets. *Complexity* **2018**, *2018*. [CrossRef]
52. Chen, C.-S.; Chiu, Y.-H.; Tsai, L. Evaluating the adaptive reuse of historic buildings through multicriteria decision-making. *Habitat Int.* **2018**, *81*, 12–23. [CrossRef]
53. Shehada, Z.M.; Ahmad, Y.B.; Yaacob, N.M.; Keumala, N.I. Developing methodology for adaptive re-use: Case study of heritage buildings in Palestine. *ArchNet IJAR Int. J. Architect. Res.* **2015**, *9*, 216. [CrossRef]
54. Dutta, M.; Husain, Z. An application of multicriteria decision making to built heritage. The case of Calcutta. *J. Cult. Herit.* **2009**, *10*, 237–243. [CrossRef]
55. Stojčić, M.; Zavadskas, E.K.; Pamučar, D.; Stević, Ž.; Mardani, A. Application of MCDM methods in sustainability engineering: A literature review 2008–2018. *Symmetry* **2019**, *11*, 350. [CrossRef]
56. Turskis, Z.; Morkunaite, Z.; Kutut, V. A hybrid multiple criteria evaluation method of ranking of cultural heritage structures for renovation projects. *Int. J. Strat. Prop. Manag.* **2017**, *21*, 318–329. [CrossRef]
57. Vodopivec, B.; Žarnić, R.; Tamošaitienė, J.; Lazauskas, M.; Šelih, J. Renovation priority ranking by multi-criteria assessment of architectural heritage: The case of castles. *Int. J. Strat. Prop. Manag.* **2014**, *18*, 88–100. [CrossRef]
58. Pavlovskis, M.; Migilinskas, D.; Antucheviciene, J.; Kutut, V. Ranking of heritage building conversion alternatives by applying BIM and MCDM: A case of Sapieha Palace in Vilnius. *Symmetry* **2019**, *11*, 973. [CrossRef]
59. Ball, R. Vacant industrial premises and local development: A survey, analysis and policy assessment of the problem in Stoke-on-Trent. *Land Develop. Stud.* **1989**, *6*, 105–128. [CrossRef]
60. Ball, R. Re use potential and vacant industrial premises: Revisiting the regeneration issue in Stoke-on-Trent. *J. Prop. Res.* **2002**, *19*, 93–110. [CrossRef]
61. Bullen, P.A.; Love, P.E. Factors influencing the adaptive re-use of buildings. *J. Eng. Des. Technol.* **2011**, *9*, 32–46. [CrossRef]
62. Caccavelli, D.; Gugerli, H. TOBUS—A European diagnosis and decision-making tool for office building upgrading. *Energy Build.* **2002**, *34*, 113–119. [CrossRef]
63. Saaty, T.L. An exposition of the AHP in reply to the paper "remarks on the analytic hierarchy process". *Manag. Sci.* **1990**, *36*, 259–268. [CrossRef]
64. Saaty, T.L. Fundamentals of the analytic network process. In Proceedings of the 5th International Symposium on the Analytic Hierarchy Process, Kobe, Japan, 12–14 August 1999; pp. 12–14.
65. Saaty, T.L. Decision making with the analytic hierarchy process. *Int. J. Serv. Sci.* **2008**, *1*, 83–98. [CrossRef]
66. Saaty, T.L. How to make a decision: The analytic hierarchy process. *Eur. J. Oper. Res.* **1990**, *48*, 9–26. [CrossRef]
67. Yu, P.-L. *Multiple-Criteria Decision Making: Concepts, Techniques, and Extensions*; Plenum Press: New York, NY, USA, 1985.
68. Saaty, T.L. Homogeneity and clustering in AHP ensures the validity of the scale. *Eur. J. Oper. Res.* **1994**, *72*, 598–601.
69. Saaty, T.L. *Multicriteria Decision Making: The Analytic Hierarchy Process: Planning, Priority Setting Resource Allocation*, 2nd ed.; RWS Publications: Pittsburgh, PA, USA, 1990.
70. Ishizaka, A.; Labib, A. Analytic hierarchy process and expert choice: Benefits and limitations. *OR Insight* **2009**, *22*, 201–220. [CrossRef]
71. Saaty, T.L. Making and validating complex decisions with the AHP/ANP. *J. Syst. Sci. Syst. Eng.* **2005**, *14*, 1–36. [CrossRef]
72. Dinçer, H.; Gorener, A. Performance evaluation using AHP-VIKOR and AHPTOPSIS approaches: The case of service sector. *Sigma J. Eng. Nat. Sci.* **2011**, *29*, 244–260.
73. Cheng, E.W.; Li, H. Analytic hierarchy process: An approach to determine measures for business performance. *Meas. Bus. Excell.* **2001**, *5*, 30–37. [CrossRef]