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Management of the renovation of monuments to optimise the buildings utility values and energy efficiency

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INTRODUCTION

The idea of giving new functions to historical objects is an opportunity to reconstruct them in compliance with all the requirements of the current conservation doctrine. Adaptation to new utility requires raising the functional values of monuments to modern standards in terms of comfort of use, energy efficiency and running costs.

The adaptation of monuments should be preceded by a thorough analysis of the existing factors and the revitalization potential. Conducting these analyses based only on conservation guidelines may discourage investors from renovating and adapting monuments to new functions. It is necessary to consider modern solutions that increase the utility value, increase monuments' energy efficiency, and reduce future operating costs.

It is necessary to search for a compromise to preserve historical values while increasing the utility value.

The multitude of aspects that arise at the interface between the protection of monuments and economic development and functional improvement make it necessary to take a holistic approach to managing cultural heritage. For this to happen, the owners and managers of the premises should show considerable determination because of the limitations and high formal requirements imposed by the conservation services. Therefore, it is necessary to develop a model of management solutions to improve the operation of the owners of the monuments.

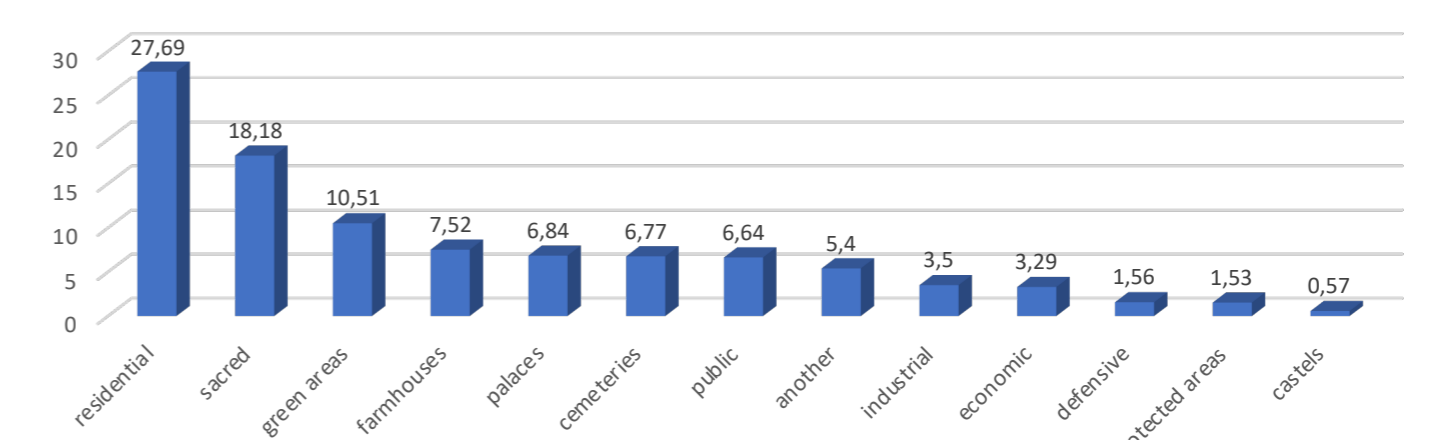
MATERIAL AND METHODS

The research subject is the management of palaces and manors, which constitute 6.84% of objects under conservation protection in Poland. It is the fifth-largest group in terms of the original function of the building. The largest group (27.69%) are residential buildings, which face similar problems.

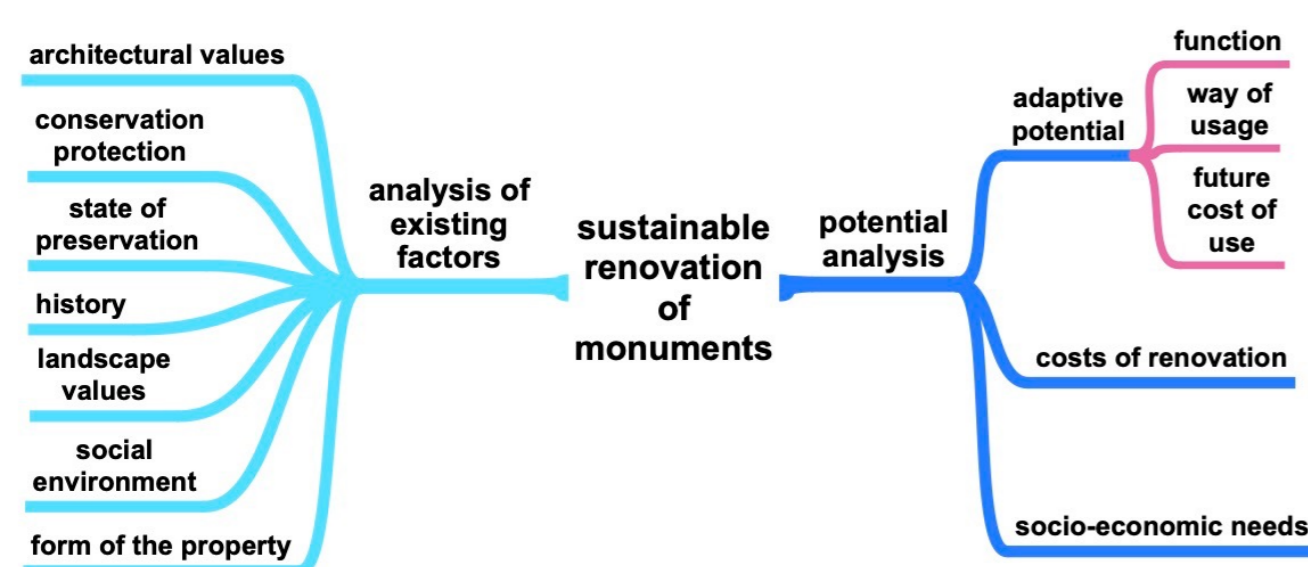
The sustainable revitalisation of historic buildings is a prerequisite for the effective protection of monuments. For many of them, adaptation to new functions and increasing the utility value by increasing energy efficiency and reducing running costs is the only chance of existence.

When planning the revitalisation or adaptation of a monument to a new function, it is necessary to analyse the existing factors and the building's potential. The holistic approach is based on conservation factors and considers environmental, functional, economic, and social aspects.

Structure of the register of immovable monuments in Poland according to primary function.



Own elaboration based on Report on the conservation of immovable monuments in Poland, NID 2017



The essential factors for sustainable revitalisation, own elaboration

The questionnaire consisting of 78 questions was developed to examine the awareness and approach to the revitalisation of owners of residential monuments, which can be divided into six thematic areas:

- basic information and contact details
- the location of the monument and the characteristics of the surroundings
- state of preservation and technical conditions
- building functionality - past, present and planned
- implementation of pro-environmental solutions
- relations with the social environment and local administration

The research is planned for a period of ten months, starting in October 2021. The questionnaire will be sent by e-mail to a minimum of 300 residential buildings. The questionnaire will be sent out in stages, divided into voivodeships. Sending e-mails will be preceded by telephone contact with the facility owner or manager to maximise the questionnaire's return rate. The analysis of the questionnaire will be based on responses from a minimum of 100 objects.

RESULTS

The study aims to analyse the conditions favourable to the implementation of pro-environmental solutions and identify the most common barriers to using such technologies.

The result of the research will be the analysis of four aspects of sustainable revitalisation expressed as:

1. catalogue of favourable conditions for the use of pro-environmental solutions
2. classification of problems related to the implementation of sustainable solutions
3. statements of the benefits of using pro-environmental solutions
4. analysis of the investor's relationship with conservation services, local authorities and the social environment.

The above statements will help develop guidelines for investors who want to adapt the historic building to its new function. The management model has a framework character due to the need for an individualised approach to each monument. One of the first steps is to create a revitalisation program. However, it is not a one-off action but a dynamic process updated throughout the renovation.

CASE STUDY - THE PALACE IN RZUCHÓW

The proposed solutions will be applied as part of the implementation doctrine in the 19th-century palace in Rzuchów. Until 2018, it was a dilapidated building undergoing a comprehensive renovation for sustainable adaptation to scientific and cultural purposes. The basis of the revitalisation program is an interdisciplinary analysis of architectural, historical, economic and environmental conditions.

The bold and innovative approach assumes creating an energy-independent building with high energy efficiency and comfortable conditions of use.

The most crucial element is an innovative energy system based on photovoltaics and hydrogen energy.

Due to the poor technical condition of the roof structure, it had to be wholly replaced. The owner decided to adapt the new construction to install photovoltaic panels on the flat part of the mansard roof. In order to hide the external elements of ventilation and air conditioning, a terrace recessed in the top has been prepared. Thanks to this, modern technologies will not infringe the historical and architectural values of the monument.

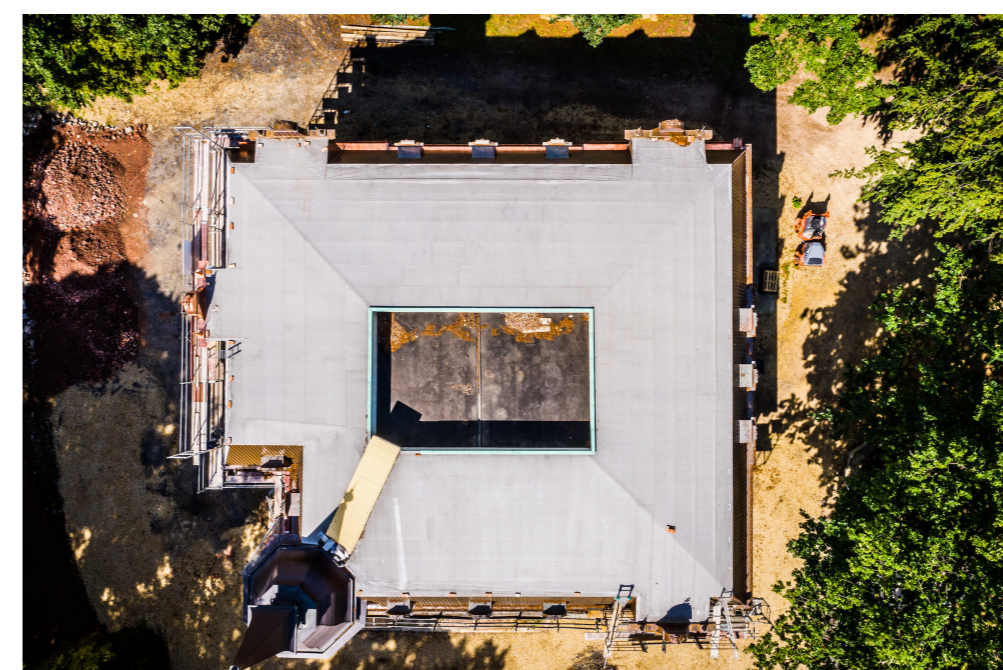
In addition to the innovative energy system, comprehensive thermo-modernization solutions are planned.



1.



2.



3.

1. Panoramic view of the palace in Rzuchów, spring 2020, photo by M. Giba
2. Panoramic view of the roof containing hidden terrace in the middle, a flat part intended for the photovoltaic panels, spring 2020, photo by M. Giba
3. Roof with a deck designed for the location of external ventilation elements, spring 2020, photo by M. Giba

SUMMARY

Work on the management model for the sustainable revitalisation of monuments is in the initial phase. My own experience in the renovation of the palace in Rzuchów and the developed tools (a database of residential monuments and a research questionnaire) will enable a multi-faceted analysis of the conditions for implementing pro-environmental solutions in Polish cultural heritage sites. Preparation of a guide containing tips and examples of good practices for investors/owners of monuments will optimise the renovation process. It will also contribute to the increase in the number of saved monuments, which received a new life thanks to their adaptation.