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Selection of Design and Technology Solutions for the Construction of a Mini-Hotel: A Theoretical Research

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Abstract
The hotel business is undergoing a significant change in its approach, which requires a thorough awareness of the elements that affect the decision-making process for these solutions. The paper examines the characteristics and benefits of a cutting-edge architectural and technological key for constructing mini-hotels within the context of promoting eco-tourism. The objective of the study was to examine the elements of construction and create a simulation of a management system for the building of mini hotels using a graph model. The study aimed to identify the key features of the system workings and evaluate them using an integrated valuation technique. The study suggests exploring the idea of constructing mini hotels also considering the funding, design, along with development of recreational spaces, and future hotel industry's profitability. This method facilitated the streamlining of the management system for mini hotel development and the identification of two primary subsystems: engineering-construction along with economics. The most optimal approach to establishing the engineering along with building aspect of the management system for constructing mini hotels has been identified. The research has concluded that the creation of hotels is shaped by a multitude of diverse influences from both the exterior and internal environment, making it an intricate process.
Keywords: *Evaluation; Eco-construction; Building management system; Mini hotel*

1. INTRODUCTION

The hotel sector is now experiencing a stage of noteworthy change, branded by fluctuating customer expectations, developments in technology, and a growing focus on sustainable practices. In this ever-changing environment, the establishment of mini hotels has become a specialized and rapidly growing industry, serving a wide range of tourists who are looking for distinctive and customized experiences. The architectural and technology aspects involved in building mini-hotels go beyond just appearance, including elements that have a substantial influence on operational effectiveness, guest contentment, and overall sustainability (Daniel et al., 2017).

In recent decades, developers have been incorporating environmental technology into the development of residential along with hotel buildings, as well as industrial and municipal infrastructure. The primary ones are:Rubbish and waste reduction during construction, Design of resource-saving engineering systems, Use of environmentally safe building materials, Creation of an optimal microclimate (Chotewit and Prapatpong, 2018).

The intricacy of construction organization stems from the wide range of organizational and economic structures, production methods, numerous participants with distinct functional objectives and tasks, and the significant reliance of the buildingprocedure on natural ecological conditions (Shchepak, 2017). The construction industry's worldwide market is inclined to broaden its sectors. One such category is the development of mini hotels. The surge in demand for hotel services has resulted in the proliferation of several hotel chains. These systems dominate the majority of hotel capacity, possess substantial financial resources, and are comprised of mini hotels.Hence, it is important to examine contemporary facets of construction administration alongside the formulation of a suitable framework for the administrative system, as well as techniques for assessing its constituents (Kruja et al., 2019).

The primary concerns in the design and construction of low-rise wooden houses nowadays are the expansion of premises by expanding their spans, guaranteeing enclosing structures' energy efficiency, and maintaining fire safety throughout the whole home.The aforementioned aspects work together to guarantee the building's lowest possible energy consumption. The primary factors that enhance the energy efficiency of building shells are the increase in its structural parts'thermal resistance and the decrease in the number of heat bridges (Shchepak, 2017).

Objective: To evaluate and choose the most suitable and advanced building solutions for mini-hotels based on a thorough analysis of factors. Literature review is explained in next section.

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2. RELATED WORK

Author and Year	Research Contribution	Remark
Daniel et al., (2017)	It was found that various factors influenced the choice of hotel locations.	These elements included the availability of communication, the quality of transportation infrastructure, and the accessibility of leisure places and tourism attractions.
Chotewit and Prapatpong, (2018)	Author stated that a management system for constructing small hotels required specific considerations.	These included the strategic placement of the hotels in relation to recreational extents, the utilization of these resources for tourist relaxation, and the potential profitability of the hotel business.
Kruja et al., (2019)	The development of novelminor hotels or even the renovation of existing structures needed to consider contemporary financial circumstances. Only initiatives that were expected to provide future profitability were being invested in.	Therefore, it was important to consider the establishment of petite hotels in relation to funding, architectural planning, the creation of leisure spaces, and the potential profitability of the future hotel venture.
Kwok et al., (2022); Hsu and Tseng, (2022)	Stated that the primary purpose was to find an investor who was interested in the growth of the hotel industry.	Invest in building small hotels to meet the great demand inside the market for hotel services.

Research Gap: Most studies primarily examine broad factors like cost, sustainability, and operational efficiency, but do not thoroughly explore the intricacies brought about by varied cultural and geographical circumstances. Hence, using the multi-criteria analysis approach will enable to ascertain the most logical choice for constructing a mini-hotel by evaluating technical and economic factors.

3. METHODOLOGY

The selection criteria use a multifaceted approach, including the resolution of several issues: technical, along with technological, along with operational, economic, along with environmental. The research chose the following criteria: labor intensity, installation speed, minimal waste generation, ease of material cutting, transportability, and installation without the requirement for specialized equipment or highly skilled individuals. When planning, many parameters were considered, including moisture resistance, along with sound insulation, along with biological and also chemical inertness, along with fire resistance, along with maintainability, along with durability, along with environmental safety, and affordability (Kwok et al., 2022).

The factor assessment approach comprised the collection of the best suitable wall building material based on qualitative along with quantitative criteria. The quality standards comprise the ability for installation in all seasons, environmental safety, and fire safety. The quantitative requirements include several factors such as building cost, minimum wall thickness, along with frost resistance, along with sound insulation, along with construction duration, longevity, and coefficient of heat transmission (Buhalis and Leung, 2018).

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Case Study:

Figure 1: General structure of Mini Hotel (Chotewit and Prapatpong, 2018)

When examining the construction technology market in Ukraine, Moldova, and the CIS for the purpose of building mini-hotels, the subsequent materials were used: ceramic bricks, hardwood bricks, along with rounded logs, along with profiled and bonded beams, a timber frame constructed of SIP(Structural Insulated Panel) panels, and light steel thin-walled (LSTW) constructions.Construction was planned to be carried out on the riverbanks of the Dniester in Tiraspol, specifically on a designated expanse of 0.7 hectares as seen in figure 1. The project involved the development of a mini-hotel involving 7 separate "guest houses", each designed with two distinct space-planning solutions (Daniel et al., 2017).

Figure 2: Architectural visualisation of hotel (Shchepak, 2017)

Type 1: The dimensions on the grid were 1-3 (10.45 m) along with A-B (11.76 m), with a floor height of 3.0 m.
Type 2: The dimensions on the grid were 1-2 (6.35 m) along with A-B (6.6 m), with a floor height of 2.9 m. The restaurant had dimensions on the grid of 14.9x21.09. The amenities at the property included adult and also children's pools, along with gazebos, along with a bath complex, along with parking for 8 vehicles, as indicated on the overall layout as seen in figure 2.
The contemporary architecture is enhanced by expansive glass windows, inspired by advanced techniques used in constructing tall buildings (Huijbens and Jóhannesson, 2019). This would result in the creation of expansive and profound interior areas while ensuring the comfort of the occupants (with a width-depth ratio of said premises at 2.00-1.63).

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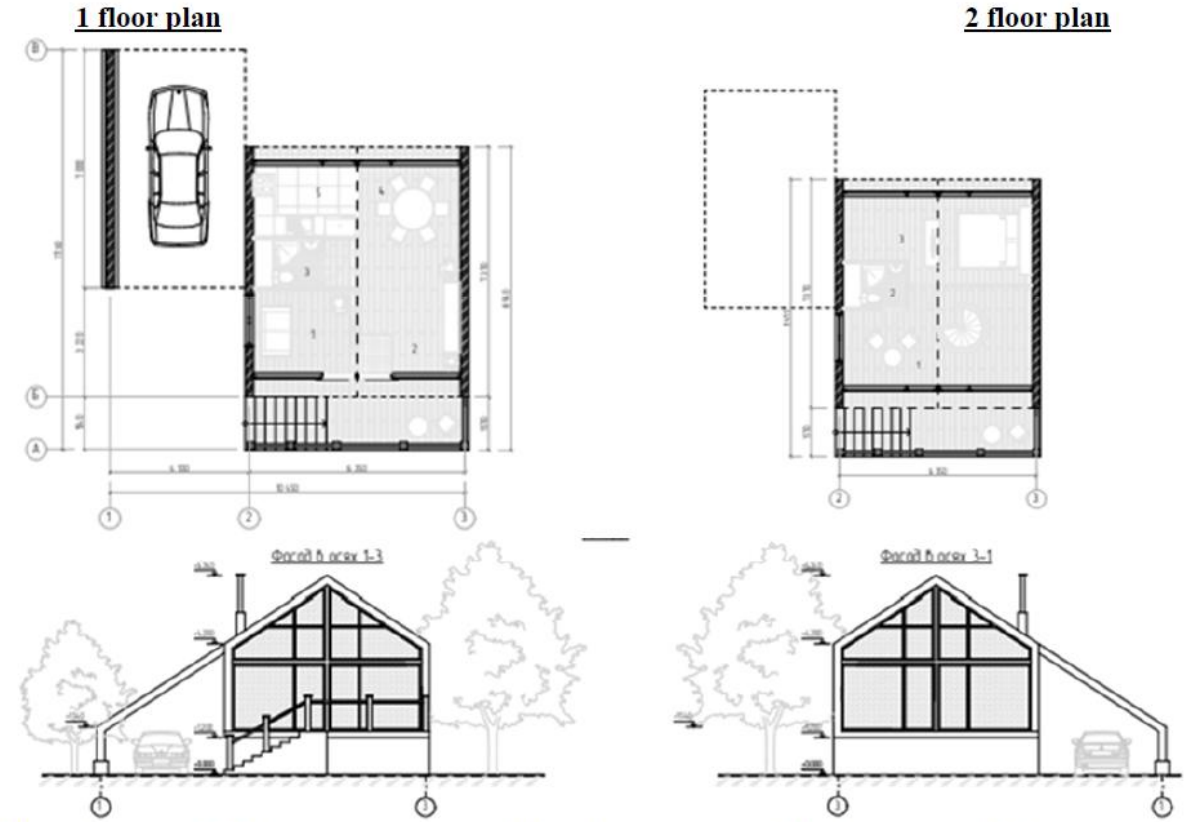

Figure 3: Space-planning solution for min hotel project (Shchepak, 2017)

4. RESULT AND DISCUSSION

Table 1: Multi-criteria assessment of constructive along withtechnological solutions (Shchepak, 2017)

Decision Evaluation Criteria	Name of design and technology solution of building frame assembly							
	Ceramic bricks	Rounded timber (pine)	Wood brick	Profiled timber	Passive glued laminated timber (with insulation)	SIP panels	CLT-panels	Light steel thin-walled structures
1	2	3	4	5	6	7	8	9
Possibility of all-season installation	no	yes	yes	yes	yes	yes	yes	yes
Number of points, K=0,3	0,6	1,5	1,5	1,5	1,5	1,5	1,5	1,5
Ecological safety	yes	yes	yes	yes	yes	yes	yes	yes
Number of points, K=1	5	5	5	5	5	5	5	5
1	2	3	4	5	6	7	8	9
Fire safety	high	low	low	low	middle	low	middle	high
Number of points, K=0,9	4,5	0,9	0,9	0,9	2,7	0,9	2,7	4,5
Dampness, %	0,5	12-18	8-10	12-20	9-10	12	12	0

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Number of points, K=0,6	3	0,9	2,4	0,6	2,4	1,8	1,8	3
Bio-exposure	no	exposed to	no	less exposed to	less exposed to	no	no	no
Number of points, K=0,5	0,5	0,5	2,5	1,5	1,5	2,5	2,5	2,5
Coefficient of heat conductivity, W/(m*C°)	0,47	0,23	0,18	0,18	0,1	0,04	0,085–0,13	0,045
Number of points, K=1	1	2,5	3	3	4	5	4	4,5
Lifetime, years	80	100	100	100	100	До 60	over 50	50
Number of points, K=0,8	3,2	4	4	4	4	2,4	1,6	1,6
Labour Effort of construction project Type 1, resource days	65.75	51,9	25,58	36,43	35,38	29,25	18,21	48,41
Number of points, K=0,9	1,8	2,25	4,05	3,15	3,15	3,6	4,5	2,7
Wall construction period with an area of 87m^2, days	11	9	4	6	6	5	3	8
Number of points, K=1	2	2,5	4,5	3,5	3,5	4	5	3
Fire resistance, min	more than 300	15	45	45	not less than 120	60	90-150	not less than 45
Number of points, K=0,9	4,5	0,9	1,8	1,8	3,6	2,7	3,6	1,8
Noise isolation, dBA	60	36	40	33	60	44	42	60
Number of points, K=0,7	3,5	2,1	2,4	1,8	3,5	2,8	2,6	3,5
Wall thickness without insulation, m	1,2	0,6	0,4	0,56	0,4	0,22	0,06- 0,5	0,15
Number of points, K=0,4	0,4	0,8	1,2	0,8	1,2	1,6	1,6	2

Table 1. Criteria 1 and 2 are not relevant in material selection as the first criterion becomes uniform across all materials whenever additional measures, such as antifreeze additives, are employed. Similarly, the second criterion is consistent across all options. Consequently, these criteria may be excluded from the building of analytical illustrations. The third along with fifth criteria underwent a transformation from qualitative indicators to quantitative ones by giving them a numerical scale ranging from 1 to 5 (Buhalis and Leung, 2018).

The criteria are simplified into a single point system, which is determined by a weight coefficient ranging 0.1 - 1. The assessment of structural and technical solutions is conducted using quantitative criteria directly on a five-point scale, with the least and highest values allocated 1 and 5 points, respectively. The remaining points were computed using interpolation.

The load-bearing exterior,along with interior walls are designed having 200mm thickness, while partitions are designed with 100mm thickness and include panel heat-sound isolating material. Also, the roof is constructed from Ruukki RAN-20B corrugated board. The roof has two angles of inclination: 25° and 50°. The first phase of the study involves prioritizing wall building materials depending on their level of significance, as shown in table 1 (Daniel et al., 2017).

The analysis of the requirements enabled the identification of constructive and technical solutions for rounded wood along with ceramic bricks. Also, both materials exhibit exceptional durability, require significant effort in terms of labor, and have a comparable construction timeline to that of a Type 1 "hotel" home. Simultaneously, these two resolutions exhibit the least resistance to heat dissipation compared to all others, making it a crucial factor for energy efficiency. Table 1 clearly demonstrates that the LSTW(LSTW) constructions solution is less favorable than the CLT (Cross Laminated Timber)-panel wooden frame resolution perlabor intensity, along with work time, along with material utilisation. The use of a CLT-panel or even SIP-panel, LSTW structures thermal profile is rationalized by the lightweight nature of metal structures along with their high load-bearing capacity, convenient processing, minimum foundation load values, along with ease of handling and lack of the need for lifting equipment.

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5. CONCLUSION

The examination of different design and technological options has emphasized the need of taking into account elements such as energy efficiency, guest experience, and operational efficiency while constructing mini-hotels. The multi-criteria analysis method was used to evaluate the structural along with technological resolutions based on key parameters. Reducing the loads caused by the unused weight of structures has been found to result in substantial economic advantages, lowering transport along with installation costs, and shortening the construction durationbarring the need for heavy equipment. The use of wooden housing construction technology provides possibilities for addressing concerns associated with the construction of pleasant, cost-effective, and energy-efficient structures. Currently, most people prefer houses made of brick, along with aerated concrete, along with panels. However, global practices and empirical evaluations suggest that pioneering technologies such as CLT-panels, along with SIP-panels, and LSTW structures with heat profiles offer significant advantages in the affordable construction sector.

References

1. Daniel P, Agnieszka G, Bolesław G, Piotr O, Barbara W, Soňa J, Julita M-P & Mariusz S, (2017). The factors influencing the decision on the location of hotels depending on their size in Poland, *Marketing and Trade*, Vol. 2, pp. 213-223.
2. Chotewit P &Prapatpong U (2018). Changes and Impacts of Heritage Building to Small Hotel Building: A Case Study of Bangkok Story Hostel, *Asian Social Science*, Vol. 14, No. 1, 2018, pp. 79-94.
3. Shchepak V (2017). Land monitoring: modeling and evaluation, Monograph 2, Association 1901 "SEPIKE" Innovation in Education and Economy, N*orderstedt, Deutschland Poitiers, France*, pp. 143-153.
4. Kruja, A.D.; Hysa, X.; Duman, T.; Tafaj, A. (2019). Adoption of software as a service (SaaS) in small and medium-sized hotels in Tirana. *Enl. Tourism. A Pathmaking J.9*, 137–167.
5. Kwok, L.; Lee, J.; Han, S.H. (2022). Crisis communication on social media: What types of COVID-19 messages get the attention? *Cornell Hosp. Q*, *63*, 528–543.
6. Buhalis, D.; Leung, R. (2018). Smart hospitality—Interconnectivity and interoperability towards an ecosystem. *Int. J. Hosp. Manag.71*, 41–50.
7. Huijbens, E.H.; Jóhannesson, G.T. (2019) Tending to destinations: Conceptualising tourism's transformative capacities. *Tour. Stud*, *19*, 279–294.
8. Hsu, H.; Tseng, K.-F. (2022), Facing the era of smartness: Constructing a framework of required technology competencies for hospitality practitioners. *J. Hosp. Tour. Techno*, *13*, 500–526.

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