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INCORPORATING SMART INTERIOR DESIGN CONCEPTS IN SRI LANKAN APARTMENT CONSTRUCTION

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ABSTRACT

Smart interior design can be interpreted as the integration of technology, innovative materials, and sustainable approaches in creating functional and aesthetically pleasing living spaces. In response to the global shortage of affordable housing, countries have begun to explore the potential of smart interior design for space-saving and cost-effective construction. This concept is still novel in Sri Lanka, where the retreat of the construction industry due the economic crisis has caused a recession in apartment construction. Thus, this research serves as a preliminary study that aims to investigate the adoptability of space-saving smart interior design concepts in Sri Lankan apartment construction, with an emphasis on the constraints faced and strategies to overcome them. The study adopted a qualitative research approach and primarily, a comprehensive literature review was conducted to define the implication of space-saving smart interior design along with the upsides of applying this technique into apartment construction. Semi-structured interviews were conducted to identify the main constraints when incorporating this concept in Sri Lanka considering both design-stage and implementation-stage. A significant obstacle uncovered was the lack of demand for the use of this concept in Sri Lanka, stemming largely from the lack of awareness of its benefits. This study recommends that the concept of smart living should be promoted through education, small-scale construction and government intervention. The strategies proposed through this study serve towards enhancing the preparedness of incorporating this concept in Sri Lanka so that the benefits of the concept may be obtained while overcoming the constraints.

Keywords: *Apartments; Construction industry; Smart interior design; Space-saving.*

1. INTRODUCTION

Sri Lanka is likely to face a severe shortage of apartment units by next year and into the future due to the current state of financial and economic instability (Hettiarachchi & Dhanji, 2024; Hewage, 2022). The nation's overall residential land price has dropped by 62.90% because people are no longer interested in investing in land and are demotivated to build houses owing to the high rates of interest for housing loans (The Island, 2022). Through a study of the real estate industry of Sri Lanka, Madushani and Piyadasa (2019)

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demonstrated that the rapid development of Colombo and other suburbs has triggered an increase in the purchase of luxury and semi-luxury apartments in Sri Lanka.

In order to face the high demand for apartment units and the concurrent shortage of apartment construction, there is a need to investigate a solution to minimise the land impact, cost of apartment construction, and carbon footprint while simultaneously enhancing the living standards of Sri Lankan apartment users. It is noteworthy that finance is the most influential factor that steers customers' purchasing decisions toward buying apartments rather than buying land and building a house (Madushani & Piyadasa, 2019; Kaluthanthri & Jayawardhana, 2022). Traditional homes were built in large sizes by allocating several small single-purpose rooms for each function. The interior design of traditional homes of the last decade has focused on one function for each type of furniture and shape (Canepa, 2017). However, it is debatable if that represents the most cost-effective and sustainable course of action. The premise of this study is that smart interior design can increase the sustainability of a residential space, particularly apartment buildings. The study focuses on apartment buildings on account of the rising demand within Sri Lanka in that category, in conjunction with the dearth of research regarding space-optimisation specific to apartment buildings.

"Smart interior design" refers to the integration of technology, innovative materials, and sustainable practices to create functional and aesthetically pleasing living spaces (Ashour & Rashdan, 2023). One of the categories of smart interior designs known as 'space-saving smart interior' refers to the use of innovative design, techniques and technology to maximise the use of limited living space, while still maintaining functionality and aesthetic appeal (Taylor, 2022). This concept not only reduces land use and improves sustainability, but also promotes reduced building-material consumption by minimising the size of structural elements and maximising the effective use of space (Barbosa et al., 2015). Nevertheless, as cost reduction alone is not a guarantee of sustainability and longevity, smart interior design must be utilised in such a way that occupant comfort and long-term satisfaction with the living space are also ensured. In Kenya, The Kibera Soweto East Housing government project which was launched in 2012 was only focused on reducing costs when coming up with the interior plans and layouts and not on the improvement of the quality of life and living standards of residents. This ultimately resulted in more than half of the apartments getting sold or rented out by the owners, and the residents moving back to the slums (UN-Habitat, 2008). After extensive research, it was recommended that using multi-functional smart interior design could have overcome this problem (Wawira et al., 2019). However, in Sri Lanka, there is still no specific research that has been carried out surrounding the incorporation of space-saving smart interior designs in apartment construction. Consequently, in the context of Sri Lanka, this concept is still a novel one. Therefore, this study will be carried out to fill the aforementioned gap by investigating constraints when applying this concept to the Sri Lankan apartment construction sector. The aim of this research is to conduct a preliminary investigation on the adoptability of space-saving smart interior design concepts in Sri Lankan apartment construction, with an emphasis on the constraints faced and strategies to overcome them.

2. LITERATURE REVIEW

2.1 APARTMENT INDUSTRY IN SRI LANKA

The Department of Census and Statistics of Sri Lanka reports that the nation has experienced a significant uptick in urbanisation and population growth in recent years (Department of Census and Statistics, 2022; Department of Census and Statistics of Sri Lanka, 2012). This has caused the construction of apartments in Sri Lanka to progress steadily, driven by the growing demand for housing in urban areas. In Sri Lanka, apartments can be divided into several categories ranging from Luxury apartments (which are the most high-end category of apartments in Sri Lanka), to Mid-range, and to Economy apartments which are designed for the more budget-conscious buyers (Lanka Property Web, 2021). The number of housing units approved for construction in Sri Lanka increased by 21.8% in 2019, with apartment units accounting for a significant portion of the increase (The Central Bank of Sri Lanka, 2020). The report also notes that the construction of multi-storied buildings, including apartments, increased by 56.4% in 2019 compared to the previous year (The Central Bank of Sri Lanka, 2020).

2.2 SMART INTERIOR DESIGN AND ITS SIGNIFICANCE

In 1989, the Intelligent Building Institute of the United States defined Smart Homes as an efficient environment which prioritises occupant effectiveness, operational efficiency, and technological usage through integrated and optimised systems, structures, services and management (GhaffarianHoseini et al., 2011). In another aspect, it can be defined as a building which essentially programs itself by observing occupants' behaviour patterns and environment instead of being programmed for only a specific action (Batov, 2015). With the fast-paced technological revolution of the 21st century, Internet of Things (IoT) technologies have made it possible to collect and analyse all the building services data without human intervention and visualise the energy or environmental data of end users (Jia et al., 2019). Smart interior design can be interpreted as the future of design where the integration of smart material, furniture, devices, and sensors enable functions to be controlled and communicated through IP network and mobile applications, to a reliable analysis system that is capable of responding quickly to inhabitant requests and deciding the most efficient way of providing a convenient, comfortable, safe, and productive environment which enhances the quality of life of the occupants (Rashdan, 2016).

2.2.1 Space-Saving Smart Interior Design

Space-saving smart interior designs can be considered a sub-set of smart interior designs, owing to a few key differences. Whereas the concept of smart interior design refers to the use of design strategies and techniques that maximise the functionality, comfort, and aesthetic appeal of a space, 'Space-saving smart interior designs' serve a more specific function and refers to the use of design strategies and techniques that focus on optimising the use of limited space (Radha, 2022). This concept involves incorporating features such as multi-functional furniture, built-in storage, and flexible layouts that can be easily adapted to different needs and uses (Husein, 2021).

2.2.2 Space-Saving Smart Interior Design for Apartment Projects

Rapid population growth and a shortage of land has resulted in limited space in resident quarters, affecting the living quality and mental health of occupants (Thøgersen, 2017). The crowded and cluttered nature of small apartments causes residents to feel trapped,

stressed and claustrophobic. The reason for this is not only the limited floor area but also the furniture and other items that occupy floor space (Husein, 2021). Thøgersen (2017) stated that multipurpose spaces require smart and space-saving furniture solutions to make the place more liveable, not crowded and claustrophobic. Intensive use of three-dimensional space is another strategy that can be used to utilise vertical space more efficiently. Several countries have implemented space-saving smart interior designs in apartment construction. Japan has applied space-saving design as a solution for high population density. Japanese architects have been known for their expertise in designing small apartments with smart interior design concepts (Brown, 2023). The Hong Kong government has introduced guidelines for small flat designs, promoting space-saving smart interior design concepts as a solution for high density (Sima, 2015). With limited land availability, the Housing and Development Board (HDB) of Singapore has been incorporating smart interior designs in their public housing projects to maximise the use of space (Jahan et al., 2024). There are several countries that use space-saving smart interior designs for space-saving purposes but also for financial reasons. For instance, Indian developers are turning to space-saving design strategies to maximise profits and minimise expenses in the construction of small apartments (Kahre et al., 2022). Similarly in the Philippines, developers are implementing space-saving smart interior designs to reduce construction costs and provide affordable housing to the masses (Ma et al., 2021).

2.3 UPSIDES OF SMART INTERIOR DESIGN

Incorporating smart interior design solutions to building systems is gaining popularity because of the technology's capability to learn and even anticipate occupants' needs and preferences. According to Ashour and Rashdan (2023), smart interior design can potentially create spaces that are functional, sustainable, aesthetically pleasing and highly responsive to occupant needs. They found that this potential can be achieved by excelling in four key criteria: integration, communication, adaptability, and control. Table 1 elaborates the upsides of incorporating space-saving smart interior designs in apartment construction.

Table 1: Upsides of incorporating space-saving smart interior designs in apartment construction

Upsides of incorporation		Reference(s)
Compact and space-saving based advantages	Enhance the functionality of the space	(Manewa, 2012), (Goessler & Kaluarachchi, 2023)
	Minimise the need for additional compartments	(Al-Shatnawi, 2020)
	Enhance the use of vertical space	(GhaffarianHoseini et al., 2011)
	Provide more space for social gathering areas	(Goessler & Kaluarachchi, 2023), (Thøgersen, 2017)
	Provide multiactivity spaces for small apartment residents	(GhaffarianHoseini et al., 2011), (Goessler & Kaluarachchi, 2023)
	Efficient use of corners	(Manewa, 2012)
	Provide greater amount of storage space	(Rashdan, 2016), (Jia et al., 2019), (Radha, 2022)
Quality and style-based advantages	Enhance performance due to systematic integration	(GhaffarianHoseini et al., 2011), (Goessler & Kaluarachchi, 2023)
	Increase lifestyle comfort	(Thøgersen, 2017), (Radha, 2022)

Upsides of incorporation		Reference(s)
	Allow to maintain healthy indoor air quality	(Thøgersen, 2017), (Jia et al., 2019)
	Using visual tricks to enhance spaciousness	(Jia et al., 2019)
	Increase demand by adding modern architectural features	(Hamid & Embi, 2016), (Batov, 2015), (Radha, 2022)
	Enhance futuristic vision in interior design	(GhaffarianHoseini et al., 2011), (Su et al., 2023)
	Increase flexibility	(GhaffarianHoseini et al., 2011), (Goessler & Kaluarachchi, 2023)
Price-based advantages	Potential to lower cost of construction	(Omar, 2018), (Aloudeh et al., 2023), (Su et al., 2023)
	Reduce size of structural elements	(Goessler & Kaluarachchi, 2023), (Su et al., 2023)
	Reduce the floor area while providing same functionality	(Goessler & Kaluarachchi, 2023)
	Potential to make apartment units more affordable	(Manewa, 2012), (Aloudeh et al., 2023), (Su et al., 2023)
Psychological-based advantages	Provide better phycological condition by avoiding being compact	(Manewa, 2012), (Rashdan, 2016)
	Provide flexibility within the house to move components in need of more space	(Al-Shatnawi, 2020)
Environmental-based advantages	Increase energy efficiency	(Omar, 2018), (Batov, 2015), (Akadiri et al., 2012)
	Reduce the land use	(Hamid & Embi, 2016)
	Promote sustainability	(Aloudeh et al., 2023), (Rashdan, 2016), (Akadiri et al., 2012)
	Allow less building material consumption	(Omar, 2018), (Rashdan, 2016), (Su et al., 2023)
	Reduce carbon footprint	(GhaffarianHoseini et al., 2011), (Hamid & Embi, 2016)

2.4 CONSTRAINTS WHEN APPLYING SMART INTERIOR DESIGN

While singular smart design amenities (devices such as sensors, displays, logic controllers, transmitters etc.) are being increasingly utilised in modern homes (Ashour & Rashdan, 2023), the concept of a 'smart home' is still relatively novel in most parts of the world. According to Liu and Chen (2023), although smart-home products of the present are technologically innovative, some are impractical for everyday use. As a result, these products perform poorly in the market since their introduction. Educating end-users is evidently a major challenge in the way of incorporating smart interior design. According to Christiansson (2007), the development of smart interior design concepts thus far has been driven mostly by information revolution and the rapid evolution of technology, rather than client's requirement. Although end-users stand to benefit significantly through these innovations, their limited knowledge on intelligent buildings creates a gap between user requirements and the services provided (Liu et al., 2010). Although smart homes have the potential to reduce costs indirectly by minimising resource wastage, optimising space usage, increasing comfort etc., there are significant direct costs attached to the

technology. As noted by Ni et al. (2023), in addition to the high initial cost, maintenance costs of smart home systems are relatively high. Users may be hesitant to make large investments in unproven concepts. The risk of data theft and privacy violation is another major constraint, according to Ni et al. (2023). As the home environment is one with needs extremely high standards of confidentiality, smart homes could potentially become dangerous sources for data theft. These constraints are exacerbated by the lack of a unified quality control standard to monitor product-quality, after-sales service and maintenance (Liu & Chen, 2023; Ni et al., 2023).

3. METHODOLOGY

The literature review was conducted by acquiring and scrutinising journal articles, conference proceedings, newspaper articles, and reports relating to smart interior designing. While many past studies have dwelled into the benefits and applicability of smart interior design, very few focus specifically on 'space-saving' smart interior design. Even fewer such studies have been conducted in the context of Sri Lanka. Thus, this research was conducted as an exploratory study to investigate the potential of incorporating space-saving smart interior design into Sri Lankan apartment construction, by determining the upsides, constraints and strategies for incorporation of this technology.

The study follows a qualitative research approach instead of quantitative, as it allows for a more in-depth preliminary analysis surrounding the concept of smart interior design in Sri Lanka. The qualitative approach is particularly beneficial in dealing with emerging and complex topics such as space-saving smart interior designs, where limited understanding and data are available in the Sri Lankan context (Rahman, 2016). Due to the exploratory nature of the study, data was gathered through semi-structured interviews where suitable candidates were chosen using non-random selective sampling. It was decided that selective sampling would be best since it enables the selection of the most pertinent responders in a judgmental manner (Saunders et al., 2019). Since the focus area of the research is a novel concept to Sri Lanka, the guideline entailed more open-ended questions. This allowed respondents to reveal their beliefs, experiences, and knowledge without restriction. Altogether, the study employed an interpretivism research paradigm, meaning that because the respondents' answers are based on their present knowledge, experience, and comprehension, they are subjective.

Fifteen (15 nr.) interviewees were chosen from three focused populations: Tenants, professionals from interior design consultation and manufacturing companies, and professionals from apartment development organisations. Five candidates from each category were chosen as the sample size for this study. This sample size allowed for an abundance of varying responses to be collected while also achieving data saturation. Five (5 nr.) tenants of different age groups that live in luxury and semi-luxury apartments in urban areas of Colombo were interviewed. Further, five (5 nr.) professionals from interior design consultation and manufacturing companies were interviewed. These candidates were chosen from reputed companies, on the basis of expertise (over 5 years of experience) and knowledge of smart interior design, the construction industry and the housing market. However, it must be noted that due to the novelty of the smart interior design concept, 4 out of the 5 interviewees selected were chartered architects. The remaining interviewees were five (5 nr.) professionals from apartment development organisations. Manual content analysis was used on the data gathered from semi-

structured interviews. Finally, the conclusions of the research were derived by harmonising all findings of the research.

4. RESEARCH FINDINGS

4.1 CONSTRAINTS IN INCORPORATING SPACE-SAVING SMART INTERIOR DESIGN IN SRI LANKA

Interviewees' opinions were gathered regarding potential constraints when incorporating space-saving smart interior design into apartment industry of Sri Lanka. It must be noted that the tenants were interviewed first, to gather more details of constraints from the perspective of potential end-users. By interviewing the construction professionals and developers later, data was collected regarding strategies to overcome these constraints. Based on the responses, the listed constraints were sub-categorised as design-stage constraints and implementation constraints. 'Design-stage constraints' are constraints that can occur when applying this concept into designs of apartment construction. 'Implementation constraints' are constraints that can arise when constructing designs of the apartment construction including space saving smart interior designs into reality. This category was further divided into social, economic, legal, technological, and other constraints. Table 2 entails a summary of the constraints identified through analysis. It is evident that the most significant constraint to incorporation is the lack of awareness among the general public regarding smart concepts. This social constraint may even be a root cause for other major constraints such as the lack of demand, less popularity, and lack of familiarity.

Table 2: Constraints towards incorporating space-saving into apartment construction

		Constraints	No. of responses
Design stage		Interior designs may vary based on user requirements	7
		Premium charges are added when developers consult interior designers regarding space-saving smart interior designs	1
		Space-saving not being a priority for users and developers	4
Implementation stage	Legal	Government tax and importing restrictions	5
		No laws imposed by the government to save spaces	3
		Apartment rules and regulations	1
	Economic	Less demand	5
		High risk involving when manufacturing	2
		Manufactures can't add considerable profit margin	4
		Cost of design is high	3
		Additional effort, time and cost are incurred in buying process	2
	Social	Cultural barriers	4
		Less popularity of vertical living	4
		Less awareness among the people about smart concept	8
		Difficulty of finding reliable manufactures	4

		Constraints	No. of responses
		Spending patterns	2
		Behavioural and thinking patterns	3
	Technological and others	Less availability of accessories	3
		Less durable	2
		Not created required maintenance skills yet	2
		Difficulty to use for elderly people	1
		Requires more maintenance because of more accessories	2
		Transforming or folding up furniture causes constrained, cluttered, and cramped feelings.	1
		Less familiar with smart technology	2

4.2 SUMMARY OF PROPOSED STRATEGIES TO OVERCOME THE IDENTIFIED CONSTRAINTS

Table 3 illustrates the strategies that this study proposes to combat the constraints identified previously. All three categories of interviewees were persistent that awareness programs are necessary to educate the public regarding space-saving smart interior design. Most tenants commented that user-friendly interfaces and maintenance guidelines would reduce the resistance to change when purchasing smart-home devices. Professionals in the apartment industry suggested that to build the users' faith in smart interior designs, products of high-quality functions, durability and user-friendly interfaces should be promoted in Sri Lanka.

Table 3: Strategies to overcome constraints

		Constraints		Proposed strategies
Design stage		Interior designs may vary based on user requirements.	S1	Conduct surveys comparing space-saving smart interior designs and apartment-user requirements.
		Premium charges are added when developers consult interior designers regarding space-saving smart interior designs	S2	Increasing awareness to normalise the concept and alert regarding its benefits.
		Space-saving not being a priority for users and developers		Provide interior design selection in 3D or animated visualisation.
Implementation stage	Legal	Government tax and importing restrictions	S3	Provide suitable creative designs in line with apartment restrictions.
		No laws imposed by the government to optimise spaces.		
		Apartment rules and regulations.		
	Economic	Less demand	S4	Promote space-saving smart interior designs into residential buildings to increase awareness regarding its benefits.
		High risk involved when manufacturing		

	Constraints		Proposed strategies
	Manufactures can't add considerable profit margin Cost of design is high Additional effort, time and cost are incurred in buying process.	S5	Conduct market research on financial feasibility.
Social	Cultural barriers	S6	Include smart living concepts in education.
	Less popularity of vertical living	S7	Conduct awareness programs.
	Less awareness among the people about smart concept Difficulty of finding reliable manufactures.	S8	Designers and developers should promote the concept with the aim of developing a trend for space-saving smart interior designs
	Spending patterns Behavioural and thinking patterns.	S9	Increase the availability of the space-saving smart interior designs in show rooms
Technological and others	Less availability of accessories	S10	Increase the availability of raw materials through local sourcing
	Less durable Not created required maintenance skills yet Difficulty to use for elderly people	S11	Manufacture with locally-sourced, durable alternative materials that are suitable for the Sri Lankan context
	Requires more maintenance because of more accessories Transforming or folding up furniture causes constrained, cluttered, and cramped feelings.	S12	Manufacture with smooth and user-friendly mechanisms suitable for all ages
	Less familiarity with smart technology	S13	Provide maintenance guidelines when purchasing

5. DISCUSSION

Space-saving smart interior design is a concept that, despite its novelty in the context of Sri Lanka, can provide great benefits for the country's housing industry. The lack of research surrounding space-saving smart interior design in the Sri Lankan context is a gap that must be bridged in order to utilise this concept to its full potential. Past studies revealed that smart design, including space-saving smart interior design in particular, holds the potential to significantly improve the quality of life of occupants while enhancing the value of apartments by reducing unnecessary costs, optimising space and improving responsiveness towards user-needs. Since this is an exploratory study, the upsides of this technology were explored first in order to establish the need for the research that followed.

In Sri Lanka, the rising cost of land and construction has driven people towards buying apartments. The dilemma within the country, however, is the halt in apartment

construction owing to the economic crisis. To summarise the upsides of space-saving smart interior design: it allows for even a smaller space to be utilised in the most efficient manner possible, thus negating the need for arduous and lengthy construction and introducing technologies which cater to occupant comfort. It is, therefore, an ideal solution that creates a win-win situation for buyers and apartment developers. The literature review uncovered several constraints relating to applicability of smart interior design. Although these studies were neither specific to 'space-saving' smart interior design nor conducted in the Sri Lankan context, they are comparable to the findings of the semi-structured interviews. One major constraint identified through interviews was that interior designs may vary based on user requirements. Liu et al. (2010) also noted that the limited understanding of this technology could create gaps between user requirements and the provided services. The proposed strategy S1 recommends surveys to be conducted to gain a better understanding of user requirements. A similar approach was suggested by Liu et al. (2010), who cited a 2006 Danish research project that proposed a method to minimise product-knowledge gaps providing a platform for clients to input their user-requirements for intelligent buildings, so that developers can use that data. It was found that cost is the most crucial deciding factor for end-users, as all the interviewees attested. The findings of Omar (2018), Su et al. (2023) and others mentioned in the literature review establish the potential cost-related upsides of smart interior designs. Alternatively, several of the identified constraints mention the cost implications of incorporating such a novel technology without proof-of-concept. These concerns are echoed by Ni et al. (2023) in the literature review, due to the high initial cost and the subsequent maintenance costs. As an exploratory study of this concept, this research concludes that there are many indirect costs that can be saved through space-saving smart interior design. On the other hand, there are direct costs associated with these newer technologies. Further research must be conducted focused on quantitative cost-benefit analyses of space-saving smart interior design. Having identified the potential constraints and suggesting strategies for overcoming them, this research acts as a preliminary study which can enhance the adoptability of this technology in Sri Lanka.

6. CONCLUSIONS

The aim of this research was to conduct a preliminary investigation on the adoptability of space-saving smart interior design concepts in Sri Lankan apartment construction, with an emphasis on the constraints faced and strategies to overcome them. The findings of the literature review revealed five categories of upsides: compact and space-saving based advantages, quality and style-based advantages, price-based advantages, psychological-based advantages, and environmental-based advantages. Semi-structured interviews were conducted to identify the constraints in adopting space-saving smart interior design. Constraints of two basic categories were identified: design-stage constraints and implementation-stage constraints. Implementation-stage constraints were further divided as legal, economic, social, technological and other constraints. Following the identification of the constraints, strategies to overcome those constraints were also provided. According to the standpoint of the tenants, conducting island-wide awareness programs and increasing the availability of space-saving smart interior designs in manufacturers'' show rooms, exhibitions, etc. will enhance the awareness among end-users and buyers. Industry professionals were of the opinion that social and economic constraints can be avoided by creating a sufficient demand for the concept through

awareness. Accordingly, the following recommendations can be made for the implementation of space-saving smart interior design in apartment construction:

- Promote smart-living concept through education – Government is required to take action to promote this concept among community to enhance the affordability of small living spaces and to avoid apartment construction shortage in future as a result of recession.
- Promote space saving smart interior designs in residential buildings – Designers can help to reduce energy consumption and promote eco-friendly living.
- Create a trend among people for space-saving smart interior designs – Developers can gain higher profits from investments by reducing construction costs and increasing the overall desirability of living spaces.

While this study serves as a preliminary study, it can be a stepping stone towards further research which quantitatively analyses the cost implications of space-saving smart interior design and conducts a cost-benefit analysis. There are limitations to this study in terms of the niche subject, as it focused solely on apartment buildings. However, several findings and proposed strategies can be reasonably applied to other residential spaces as well. Thus, this study can benefit more research on the subject of space-saving interior design, when being applied to other residential spaces. Although the findings of this study were derived from the Sri Lankan context, they can also be reasonable applied in the context of countries with similar economic, and social conditions including similar population density, and real-estate trends. Overall, the findings of this study and the recommended strategies serve towards creating awareness, and enhancing the preparedness of incorporating this novel concept to Sri Lanka so that the construction industry of Sri Lanka can realise its benefits while overcoming the obstacles.

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