ISSN (Print): 2788-8320 ISSN (Online): 2788-8339

JOURNAL OF SOCIAL RESEARCH DEVELOPMENT
www.jsrd.org.pk editor@jsd.org.pk

MOVEABLE PREFABRICATED INTERIOR SYSTEM AS COST-EFFECTIVE AND FLEXIBLE SOLUTION FOR LEASED COMMERCIAL OFFICE IN PAKISTAN

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KEYWORDS

Moveable prefabricated interior system; leased commercial office; cost-effectiveness; flexibility; adaptability; Pakistan; sustainable office design

ARTICLE HISTORY

Date of Submission: 27-08-2026
Date of Acceptance: 02-10-2026
Date of Publication: 07-10-2026

ABSTRACT

This study examines the potential of the moveable prefabricated interior system as a cost-effective and flexible solution for leased commercial offices in Pakistan. The research is grounded in the growing need for adaptable office environments that can respond to changing tenant requirements, frequent layout modifications, departmental restructuring, and uncertain lease durations. In conventional leased office settings, fixed interior systems often lead to repeated renovation costs, demolition waste, limited spatial adaptability, and loss of investment during relocation. To address this issue, the study explores whether moveable prefabricated interior systems can provide a more practical and sustainable alternative. A qualitative and questionnaire-informed research approach was used to investigate the economic, functional, and environmental value of these systems in the Pakistani commercial office context. The study framework focused on key dimensions including cost-effectiveness, flexibility, adaptability, waste reduction, and overall suitability for leased office environments. For draft development purposes, the results section of this paper was structured using provisional data to demonstrate the expected analytical pattern. The findings indicate that moveable prefabricated interior systems are perceived as highly beneficial for reducing repeated fit-out costs, improving spatial flexibility, supporting office reconfiguration, and minimizing waste generated through conventional renovation practices. However, concerns related to initial cost, awareness, and local market readiness remain important barriers to broader adoption. The study concludes that moveable prefabricated interior systems offer strong potential for improving leased commercial office design in Pakistan by combining economic efficiency, adaptability, and sustainability. The research also provides a foundation for future field-based investigation using actual empirical data.

2026 Journal of Social Research Development

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DOI https://doi.org/10.59075/jsrd.v7i8.575
Volume/Issue **7(8), 2026, 220-244**

Introduction

The commercial office market is experiencing an apparent change in the long-standing position on the space planning of items that are not at all dynamic because of the need to adjust to the changing economic demand, the structure of teams, the digital processes, and the occupancy trends. The shift is particularly critical in Pakistan where the construction sector continues to experience inefficiency, high costs, delays and environmental issues in the traditional building methods. According to a recent study on prefabrication conducted in Pakistan, the industry stakeholders are becoming increasingly aware of the possibilities of prefabrication to enhance productivity, minimize waste, and facilitate enhanced project performance, yet the barriers to its adoption, including increased initial cost, lack of skilled labor, underdeveloped infrastructure, and policy gaps, continue to hinder its implementation (Hamza et al., 2023; Hassan et al., 2 Here, the debate of interior systems ceases to be merely aesthetic; it is an economic, operational and strategic one. In the case of business tenants operating in rented premises, particularly in the dynamic business environment of a city, interior choices must be made more and more in favour of short- to medium-term flexibility, as opposed to long-term investment in permanent fit-out.

This concern is even more important taking into account the character of the modern use of offices. Recent office studies indicate that the transformation of the workplace post-pandemic has enhanced the pace of hybrid work, integration of technology, and need to be flexible, resilient, and health-focused, in office workplaces (Hou et al., 2025). Meanwhile, office interiors are one of the most renovated areas of the built environment. According to a 2026 study of office interior renovation, commercial offices are often subject to a series of fit-out and renovation works due to organizational restructuring, technological upgrades, tenancy needs, and changing workplace strategies; in most metropolitan situations, office interiors are refurbished every five to ten years or even more often (Chu et al., 2026). This fact can be of great use in the case of leased business offices where the tenant might have to modify the layout, add privacy, develop meeting areas or change the entire office before the physical existence of the traditional partitions or finishes has been fulfilled. In these circumstances, inflexible interior design may prove to be a cost burden and a waste of material instead of a long-term asset.

The moveable prefabricated interior system is a promising alternative within this new debate. The wider literature on adaptive buildings understand adaptability as the ability of a building or its elements to suit varying purposes and needs without a significant renovation, demolition, or reconstruction (Mlote et al., 2024; Staehr et al., 2025). Practically, a relocable prefabricated interior system can consist of modular partitions, demountable walls, standardized panels, relocable work pods, or reusable interior elements, which are produced or assembled off-site and then assembled, disassembled, reconfigured, and reused with relative simplicity. The literature on mountable and demountable partition systems highlights their usefulness as an alternative to masonry and plasterboard, especially due to their ability to enable repeated installation/removal, simpler construction, less waste, and recycling of the parts (Jorge and Goncalves, 2023). Likewise, recent research on the creation of conversion and movable interior systems suggests that flexibility

and functionalism can continue to extend the usefulness of the building, as well as reducing material usage and construction wastes (Vuscan & Muntean, 2025). Such systems are particularly applicable in interiors which are likely to evolve through the tenancy period as a result of these arguments.

Such systems should not be considered solely in terms of initial purchase price in terms of their cost-effectiveness. True cost in leased commercial offices is installation cost, work disruption, demolition in case of reconfiguration, damage of materials to be disposed, and loss of fit-out investment in the event of a tenant vacating the office. Even though a lot of the best quantitative data in the literature is based on building-level prefabrication, as opposed to interior-only systems, the trend of the results is still informative. In a life-cycle analysis of prefabricated buildings, Wang et al. (2020) identified a lower cost per square meter, a decrease in energy use and carbon emissions than the conventional construction. Other studies about Pakistan also report prefabricated construction technology as a path to improved budget and schedule performance, enhanced waste management, and increased efficiency, although implementation obstacles are still significant (Hamza et al., 2023; Hassan et al., 2024). Combined, these studies indicate that prefabrication translated into the interior systems that allow repeated relocation and reuse can be cost-effective due to less labor intensive use, less demolition, less downtime, and value retention through a series of lease cycles instead of a singular installation. This is one of the reasons why the subject should be given special attention in the context of the Pakistani commercial office.

The second significant reason that supports the topicality of the topic is flexibility. Modern workplaces are demanding environments in which areas can transition to both focused work, collaborative meetings, temporary teams, client interaction and hybrid usage with technology. Future workspace studies indicate that future workspaces include flexibility, diversity of use, and multi-use opportunity as the main space preferences in the modern work environment (Pan et al., 2023). In a similar analysis, Pan et al. (2024) also demonstrated that environmental design characteristics like ventilation, daylight, and spatial quality are major influences of workplace preferences of occupants, which upholds the notion that office design must consider the adaptability of users as opposed to fixed confinement. Adaptability research also emphasizes that modularity, flexibility, convertibility, and upgradability are essential approaches to the extension of building life and minimization of obsolescence (Mlote et al., 2024; Staehr et al., 2025). In the case of leased commercial offices in Pakistan, this is especially important since the requirements of the tenants can evolve quicker than the construction of the fixed structure. A mobile prefabricated interior system can thus accommodate growth and shrinkage, rearrangement of departments and relocation at the lowest cost of useless rebuilding.

Despite the growing body of literature on prefabrication, adaptable buildings, office transformation, and interior renovation, a clear contextual gap remains. The literature is mostly talking about prefabrication on the building level, flexibility in the workplace in general, or flexible design on a macro sustainability level, whereas little has been said on the moveable prefabricated interior system, as a viable solution to the leased commercial office setting in

Pakistan. The purpose of this paper is to discuss the ways in which the moveable prefabricated interior system can be utilized as a resourceful and economical solution in the Pakistan leased commercial office industry. To be more exact, it aims at investigating the notion and practical worth of such systems, how they might reduce recurrent fit-out expenses and wastage, how they would enhance spatial flexibility and adaptability, and how they would compare with the traditional fixed interior solutions. By so doing, the paper will aim at providing a context sensitive insight into the ways in which interior design strategies can react more positively to tenancy uncertainty, the evolving workplace needs and the issue of sustainability in Pakistan.

Literature Review

Prefabrication and Moveable Interior Systems

The current literature introduces prefabrication as not only a building technique but a strategic design to enhance productivity, minimize the waste, and provide the building with an opportunity to perform better throughout the life cycle. Generally speaking, prefabrication can be defined as the manufacturing of components or modules off-site and then transported to the site to be assembled in a more controlled environment than traditional in-situ construction. Offsite and prefabricated construction reviews clarify that prefabrication may include panelized systems to modular systems, with increased focus on standardization, logistics, and integration of design, manufacturing, and assembly (Wang et al., 2025; Hamza et al., 2023). In interior design, the general logic has been re-applied into moveable or dismountable interior systems like modular partitions, reusable wall panels, relocatable pods, and reconfigurable work space elements. These systems are not conventional brick, block, or fixed gypsum partitions since they are supposed to be installed, dismantled, relocated, and reused without significant damage to the base building fabric (Jorge et al., 2023; Ostapska et al., 2024).

It is also evident in the literature that moveable interior systems are directly connected to the principles of modularity and design to manufacture and assemble. A recent case-based study of modular demountable building products discovered that modularization of products, rational demounting, logistics optimization, and component integration enhances assembly efficiency and reduces waste and cost pressures (Wang et al., 2025). Though the study was in the context of building products in a bigger picture, its concepts can be directly applied to interior systems since interior partitions and fit-out elements are some of the most frequently changed elements in commercial space. Similarly, Jorge et al. (2023) define sustainable movable interior walls as an alternative to masonry or plasterboard, focusing on re-use and re-assembly using the same elements, simplified implementation, and reduced environmental impact through reuse. According to this literature, the moveable prefabricated interior systems are not a temporary replacement of inferior quality but are being considered more and more as an intentional, performance-oriented systems that are adaptable to the shifting spatial requirements.

Cost-Effectiveness and Life-Cycle Value

Another key theme of the literature is that the economic merit of prefabrication must be evaluated based upon life-cycle performance and no longer only based upon initial cost. Conventional practice: Interior systems that are fixed can be seen as being familiar and less expensive at the time of installation, but they can create recurring future expenses in the form of demolition, labor-intensive adjustment, downtime, and disposal of waste products whenever the layouts are altered. In a life-cycle assessment of prefabricated buildings, Wang et al. (2020) discovered that prefabrication might save the total cost per square meter and lead to an increase in environmental performance, which could be shown not only in the initial purchase but also over time. Innovative partition walls that were more recently investigated also revealed the same result; in particular, prefabricated partition systems could perform better in terms of the environment provided that recycled content and minimization of waste are introduced, but once again, the authors stress that performance is context-dependent and should be assessed instead of being assumed (Meireles et al., 2024).

The leased commercial office is especially significant in this life-cycle view, as interior investment can be at risk due to tenant turnover and reconfigurability. The 2025 research on rentable office fit-out waste, in particular, would be particularly applicable in this case since the authors directly contrasted office situations with fixed and movable partitions during a 50 years period of service. According to the study, movable partitions minimized overall wastes by approximately 36 percent of that of fixed partition walls, whereas open-plan design and flexible partitioning minimized the embodied energy loss and refurbishment effects due to the repetitive tenant turnover (Bakırhan et al., 2025). This finding is also important not just to the environment but also substantiates the thesis that reusable interior systems maintain value over several lease cycles. In the case of leased offices, cost-effectiveness should also mean removability, reusability, rapid installation, and reduced impact on business operations, which have been mentioned in the recent literature as benefits of prefabricated and demountable systems (Bakırhan et al., 2025; Wang et al., 2025).

Flexibility and Adaptability in Office Interiors

One of the most powerful recurrent themes in the office design research today is flexibility. Research after the pandemic indicates that permanence, prestige, or density are no longer the primary considerations in office space; instead, it is now assessed according to its capacity to support hybrid work, changing occupancy, collaboration, focused work, and user wellbeing. A systematic review of post-pandemic workplace change discovered that remote and hybrid working, digital integration, and an emphasis on more flexible workplace strategies are redefining the office design (Hou et al., 2025). Meanwhile, co-working and hybrid workspaces studies demonstrate that users appreciate the diversity of space, the possibility of multi-use, daylight, ventilation, and flexible layouts capable of addressing shifting patterns of utilization (Pan et al., 2023; Pan et al., 2024). This change in user expectations renders rigid interior fit-out to be less compatible to the modern office environment.

The broader adaptability literature supports this argument by characterizing adaptable buildings as ones able to adapt to evolving needs, conditions and uses without significant renovation, demolition, or construction. Mlote et al. (2024) also discovered in a systematic review based on PRISMA that adaptability is becoming more appreciated, as it positively impacts longevity of use and minimizes obsolescence, as well as decreases waste and carbon footprint in the long term. Notably, the review demonstrates that the concept of adaptability is not one-dimensional but is multidimensional and includes spatial design, materials, technological systems, and user requirements. Moveable prefabricated interior systems in the context of commercial offices are consistent with this definition in that it allows internal transformation without the significant physical reconstruction. This is especially applicable to leased offices: in such cases, tenants frequently require adjustments to room size, privacy, team areas, and distributions of the services, and they can hardly afford to request reconstruction to take place permanently in rented buildings. The literature thus substantiates the perception that moveable prefabricated systems are not just flexible in a functional approach but also strategically aligned with the long-term adaptability agenda in the contemporary building design (Mlote et al., 2024; Vuscan et al., 2025).

Sustainability, Circularity, and Fit-Out Waste

The other theme that is significant in the literature is the relationship that exists between demountable systems and circular design. Conventional office fit-outs are associated with a high amount of waste as partitions, ceiling features, finishes, and fittings are dismantled prior to the expiry of their service life when a new tenant or new workplace plan is rolled out. Recent scholarship has thus shifted away to more specific concepts like design to disassemble, material flows that are circular and waste prevention through flexible design. In a systematic scoping review of design for disassembly, Ostapska et al. (2024) discovered that the discipline has paid more attention to barriers, frameworks, tools and BIM integration, as well as connection systems that allow buildings and components to be dismantled more efficiently. Likewise, Jorge et al. (2023) believe that demountable interior partitions could be less harmful to the environment since the same elements can be reused in different designs rather than discarded after the first application.

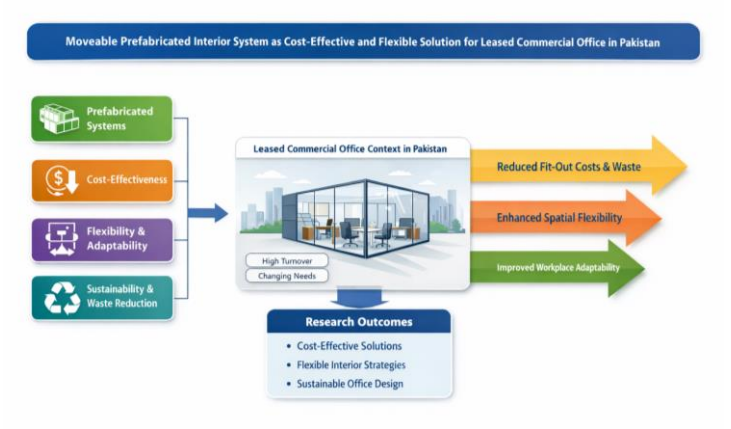
This consideration is particularly pertinent to office interiors since the remodelling is a common practice. According to Chu et al. (2026), regular office interior renovation brings about not only sustainability concerns, but also concerns regarding indoor environmental quality and health, implying that interior change has since become a significant performance concern in its own right. Bakikhan et al. (2025) also indicate that in rentable offices, the wall systems are one of the leading sources of fit-out waste as they have a high turnover rate. The assertion that multifunctionality and adaptable interiors may lead to space material savings and construction waste reduction and the extension of the useful life of space can be supported by recent evidence on the movable interior systems in building conversion (Vuscan et al., 2025). Combined, these researches suggest that moveable prefabricated interior systems are well-adapted to the concept of the circular economy since they contribute to changing the office design to be less focused on demolition-based change and more on reversible and reusable change.

Pakistan Context and Research Gap

Despite the booming growth in international literature on prefabrication, adaptability and demountable systems, limited evidence base specific to Pakistan and more focused on construction-sector use rather than interior commercial use. Based on the analysis of 250 construction professionals in Pakistan, Hamza et al. (2023) discovered that the perceived usefulness, ease of use, trust, and satisfaction are significant determinants of stakeholder acceptance towards prefabricated construction technology. Hassan et al. (2024) also indicate that prefabrication in Pakistan is perceived as a means to enhance construction efficiency, quality, time performance, and sustainability, yet its implementation is hampered by high initial cost, lack of infrastructure, and skilled labor, and insufficient policy support. The significance of these studies is that they indicate that not only does Pakistan have a practical need, but also an emerging interest in prefabricated solutions, but sectoral adoption is still incomplete.

But there is still an apparent research gap. Majority of the recent works cover prefabrication on the level of buildings, housing, or construction management in general, and less works concern moveable prefabricated interior systems in leased business offices. Similarly, the office literature is highly in favor of flexibility, circular fit-out and repeated reconfiguration but majority of the studies have been conducted in international settings as opposed to Pakistan. Consequently, little context-based insight exists into the possibility of moveable prefabricated interior systems to offer a cost effective and adaptable solution to leased commercial offices in Pakistan, where rent unpredictability, financial limitations, organizational dynamics and emerging market conditions may influence uptake differently. This gap warrants the additional study that relates the global literature on adaptability and circular fit-out with the realities of the commercial office industry in Pakistan.

Framework



Methodology

Research Approach and Design

This research will utilize a mixed-methods research design since the research issue is characterized by both quantifiable trends and descriptions. Mixed-methods design is used when neither the quantitative nor the qualitative data can explain a complex problem independently and when the two types of data are purposefully combined to generate a more comprehensive picture of the problem. According to the recent methodological advice, however, the characteristic of mixed-methods research is not merely the fact that two types of data are used, but that they are combined at design, analysis and interpretation phases.

To be more exact, the given study is based on convergent mixed-method research design. Under this design, both quantitative and qualitative data are gathered at the same stage, processed separately, and afterwards, joined to be interpreted. It is appropriate to the current research since the questionnaire already has a closed-ended Likert-scale and open questions. Mixed methods studies that have employed such survey tools in recent years indicate that such side-by-side collection is appropriate in convergent designs, particularly when the researcher would like to have the numerical trends as well as explanatory remarks of the same respondents.

Population and Sampling

The proposed study target population includes the stakeholders directly related to the leased commercial office interiors in Pakistan. This involves architects, interior designers, contractors, office managers, facility managers, and commercial tenants who are aware of the office fit-out practices, layout modifications, and interior decision-making. The research is concentrated on large urban business hubs in Pakistan including Karachi, Lahore and Islamabad where the creation of leased offices is more widespread, and where interior reconfiguration would be more prevalent.

The reason behind the use of a purposive sampling technique is that the study needs a sample of individuals with practical experience in office interiors and rented workplace experience. It is not aimed at generating national statistical generalization, but at collecting informed feedback about the participants who are able to estimate the cost, flexibility, and practicability of moveable prefabricated interior systems. In case of the survey phase, a realistic sample of about 40-60 respondents is appropriate in a small study of an academic study. In the case of the qualitative portion, the focus is on gathering meaningful open-ended responses as opposed to high volume since in mixed-methods research the qualitative portion is employed to elaborate and interpret the quantitative results.

Research Instrument and Data Collection

A structured questionnaire is used in collecting data divided into two parts. Part I will include closed-ended questions with a five-point Likert scale of strongly disagree to strongly agree. These

products test the key study variables: cost-effectiveness, flexibility and adaptability, sustainability and performance, and general appropriateness of moveable prefabricated interior systems to leased commercial offices in Pakistan. The second section consists of open-ended questions enabling respondents to narrate perceived advantages, practical issues, and constraints to adoption, and improvement recommendations.

This instrument type is methodologically correct since mixed-methods questionnaire research tends to include scaled questions with qualitative remarks to describe the extent of perceptions as well as the reasoning of the same. The recent efforts of integrated mixed-methods survey design also demonstrate that connecting qualitative and quantitative items based on the same constructs enhances the levels of coherence and subsequent synthesis of results. Both types of data are gathered simultaneously in the same respondents in the current study, which enhances the comparison and interpretation of the two strands.

Data Analysis

The descriptive statistics in the analysis of the quantitative data include frequencies, percentages, mean scores, and standard deviations. These methods are suitable since the aim of the research is to establish response patterns, generalize perceptions and compare relative intensity of various constructs but not establish more complex causal associations. Tables are used to provide the quantitative results and then the paragraph interpretation is provided.

Thematic analysis is used to analyze the qualitative data of the open-ended questions. Thematic analysis has been broadly acknowledged as a versatile and rigorous technique of discovering patterns of meaning in qualitative data. In the present study, the answers are read over and over again, line by line, put into categories and then further elaborated into general themes and subthemes based on cost burden, flexibility requirements, barriers to implementation, sustainability issues and market preparedness. This type of thematic approach in a stepwise way is suggested by recent methodological literature as it enables transparency, clarity, and more robust interpretation of qualitative results.

The two strands are combined after the respective analyses at the interpretation stage. This implies that the quantitative tables are read together with the qualitative themes to identify where the results have reached an agreement, elucidated each other, or where there is tension. The mixed-methods advice currently emphasizes that this integration is necessary since it leads to a more comprehensive description than that of either of the datasets. The integration used in this research will not only be useful in explaining whether the respondents are in support of moveable prefabricated interior systems, but also the reasons why they are in support and the perceived barriers to the same in the Pakistani context.

Ethical Considerations

Ethics are followed in the study. Their participation will be on a voluntary basis and the respondents will be made aware of the objective of the study prior to filling the questionnaire. The confidentiality is ensured by not revealing personal identity, and reporting findings in summary format. Respondents will also have the choice of not answering any question when they are not comfortable. These measures will facilitate research rigor and reliability that are particularly essential in mixed-methods research where both quantitative answers and personal written views are gathered.

Quantitative Results

Demographic Profile of Respondents

Table 4.1 presents the demographic characteristics of the respondents included in the dataset.

Table 4.1: Demographic profile of respondents (n = 50)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	31	62.0
	Female	15	30.0
	Prefer not to say	4	8.0
Age Group	20–30	16	32.0
	31–40	17	34.0
	41–50	9	18.0
	51 and above	8	16.0
Profession	Architect	11	22.0
	Interior Designer	20	40.0
	Office Manager	10	20.0
	Commercial Tenant	0	0.0
	Contractor	5	10.0
	Facility Manager	4	8.0
City	Karachi	21	42.0
	Lahore	11	22.0
	Islamabad-Rawalpindi	11	22.0
	Faisalabad	2	4.0
	Peshawar	2	4.0
	Other	3	6.0
Experience Group	1–3 years	12	24.0
	4–7 years	21	42.0
	8–12 years	10	20.0
	13 years and above	7	14.0

According to table 4.1, the sample is characterized by a higher number of male respondents (62.0%), and the second group is the female respondents (30.0%). The largest age group is 3140 years (34.0%), then comes 2030 years (32.0%), which means that the majority of the respondents are at the age of professionally working age. The most represented category in terms of occupation is interior designers (40.0%), then architects (22.0%) and office managers (20.0%). This can be used in the current research since such participants are directly involved with the office planning, space management and interior decision making. Karachi provides the most percentage of responses (42.0%), which is understandable because it has a great commercial office representation. The largest experience category is 4 to 7 years (42.0%), indicating that the dataset represents respondents who have moderate experience in their professions.

Office and Lease Characteristics

Table 4.2 presents the office-related profile of respondents, including office type, lease status, frequency of modification, main reasons for change, and the current interior system in use.

Table 4.2: Office and lease-related characteristics (n = 50)

Variable	Category	Frequency (n)	Percentage (%)
Office Type	Small office	14	28.0
	Medium office	11	22.0
	Large office	11	22.0
	Shared/co-working office	5	10.0
	Corporate office	9	18.0
Leased Building	Yes	43	86.0
	No	7	14.0
Modification Frequency	Occasionally	7	14.0
	Sometimes	19	38.0
	Frequently	17	34.0
	Very frequently	7	14.0
Main Reason for Change	Staff expansion	8	16.0
	Departmental changes	13	26.0
	Client requirements	10	20.0
	Brand-image update	12	24.0
	Rent-relocation issues	5	10.0
	Other	2	4.0
Current Interior System	Fixed traditional partitions	9	18.0
	Gypsum board partitions	11	22.0
	Glass partitions	11	22.0
	Modular-moveable systems	11	22.0
	Mixed system	8	16.0

According to table 4.2, most of the offices in the dataset are found in leased buildings (86.0%), which well correlates with the investigation focus. In terms of office type, small offices (28.0) represent the biggest percentage, but the medium and large office types are also represented significantly (22.0 and 22.0 respectively). The rate at which the office is changed is also noteworthy: 48.0% of the respondents said that their office interiors are changed either frequently or very frequently, with the other 38.0% choosing sometimes. This proves that change of layout is a repeating problem of the rented commercial offices. Departmental changes (26.0%), brand-image updates (24.0%), and client requirements (20.0%), are the most frequently used reasons to change the interior. Gypsum, glass and modular-moveable systems represent 22.0 each in terms of current systems, implying a hypertrophic landscape with both traditional and flexible solutions already existing.

Descriptive Statistics of Major Quantitative Constructs

The major quantitative constructs of the study were measured through Likert-scale items and summarized using mean scores and standard deviations.

Table 4.3: Construct-wise descriptive statistics

Construct	Mean	Standard Deviation
Cost-effectiveness	4.14	0.28
Flexibility and adaptability	4.21	0.26
Sustainability and performance	4.06	0.30
Suitability	4.06	0.38
Barrier perception	4.05	0.46
Overall positive perception	4.11	0.17

As indicated in Table 4.3, all the key constructs registered mean scores that exceeded 4.00, which is an indication that there was general positive orientation towards moveable prefabricated interior systems in the dataset. Flexibility and adaptability (M = 4.21) have the highest mean indicating that the respondents most closely relate these systems to flexibility and space modification ease. The cost-effectiveness (M = 4.14) is used as the second-highest construct, indicating that such systems are also economically valued by respondents. The score of sustainability and performance and suitability is 4.06 which reflects moderate to strong agreement. Barrier perception (M = 4.05) is also high, which implies that the respondents perceive barriers to adoption as vivid even when being aware of the benefits of the system. The mean positive perception of 4.11 indicates that the overall perception towards moveable prefabricated systems is good.

Quantitative Results for Cost-Effectiveness

The cost-effectiveness construct includes seven items related to repeated renovation expense, labor, installation time, reuse value, and financial benefit.

Table 4.4: Item-wise results for cost-effectiveness

Item	Mean	SD	Agreement (%)
Conventional fixed interior systems are expensive to modify in leased offices	4.00	0.69	80.0
Interior alterations in leased offices often lead to unnecessary demolition costs	4.16	0.70	82.0
Moveable prefabricated interior systems can reduce repeated renovation expenses	4.24	0.71	84.0
Moveable systems can save labor and installation time	4.06	0.79	80.0
Reusable interior components provide better value over multiple office changes	4.26	0.72	88.0
Moveable systems are more economical in the long term than fixed construction	3.94	0.84	70.0
Reduced downtime during reconfiguration is an important financial benefit	4.30	0.61	92.0

Table 4.4 outcomes indicate that there is a high perception that moveable prefabricated interior systems have significant cost benefits in leased offices. The best mean score is registered on the item Reduced downtime during reconfiguration is an important financial benefit (M = 4.30) and 92.0% agreement, which means that time-saving is considered to be one of the most significant economical advantages. In the same vein, reusable elements that offer superior value in multiple office transitions (M = 4.26) were well supported, which indicates that the respondents can interpret cost-effectiveness in the life-cycle scope, instead of considering it as the initial cost of installation. The lowest mean in this part is long-term economy as opposed to fixed construction (M = 3.94). This value is still a positive one, but it indicates that there is a certain degree of caution as to whether the long-term savings are immediately apparent to users or not. On the whole, though, the cost-effectiveness findings definitely indicate that the recurring modification expenses in leased offices could be minimized by moveable systems.

Quantitative Results for Flexibility and Adaptability

This construct was measured through seven items that focused on layout change, temporary spaces, expansion, downsizing, and support for uncertain lease conditions.

Table 4.5: Item-wise results for flexibility and adaptability

Item	Mean	SD	Agreement (%)
Leased commercial offices need systems that can respond quickly to changing requirements	4.48	0.61	94.0
Moveable prefabricated interior systems make spatial	4.18	0.72	90.0

reorganization easier			
These systems are suitable for temporary cabins, meeting rooms, and collaborative spaces	4.00	0.67	82.0
Moveable systems support expansion or downsizing with less disruption	4.10	0.61	86.0
Flexible interior systems are more appropriate for modern office needs than permanent partitions	4.28	0.76	82.0
Adaptable interiors improve the functional efficiency of leased office spaces	4.08	0.72	78.0
A moveable prefabricated interior system can better support uncertain lease duration and future relocation	4.32	0.68	88.0

Table 4.5 indicates that flexibility is the most perceived benefit of moveable interior systems that are prefabricated. The statement with the highest mean in the whole quantitative data is noted to be that of Leased commercial offices require systems able to react quickly to any varying requirements (M = 4.48) and the agreement is 94.0%. This is a solid point to the main argument of the study subject. The high agreement is also obtained on the items of future relocation and the uncertainty of lease term (M = 4.32) and suitability to modern office requirements (M = 4.28). These reactions suggest that participants believe that moveable systems can be particularly applicable in modifying office settings. The lowest mean in this construct, which is associated with temporary cabins and working spaces (M = 4.00) also indicates positive support. Hence, the statistical evidence points strongly to the fact that leased commercial offices have an advantage of flexible interior systems, which enables reorganisation to be reinstated fast and with minimum disturbance.

Quantitative Results for Sustainability and Performance

The sustainability and performance construct includes six items dealing with waste reduction, environmental responsibility, material reuse, practicality, durability, and sustainable office design.

Table 4.6: Item-wise results for sustainability and performance

Item	Mean	SD	Agreement (%)
Reusable interior systems can reduce construction waste in office renovation	4.26	0.72	84.0
Moveable prefabricated systems are more environmentally responsible than repeatedly rebuilding fixed interiors	4.10	0.74	82.0
These systems can improve material reuse when offices relocate or change layout	4.02	0.71	76.0
Moveable interior systems are practical for the Pakistani commercial office market	3.88	0.66	72.0
The quality and durability of moveable prefabricated interior systems are acceptable for commercial use	3.98	0.74	80.0

Such systems can support a more sustainable office design approach in Pakistan	4.10	0.74	82.0

According to the findings presented in Table 4.6, the respondents tend to correlate the moveable prefabricated interior systems with the environmental and performance-related benefits, in general. The most powerful statement in the construct is reduction of waste in the office renovation (M = 4.26) with 84.0% agreement, as it shows that reusable systems are perceived to be more effective than the demolition-based change of interior. Environmental responsibility (M = 4.10) and support to a more sustainable approach to office design is also supported positively in Pakistan (M = 4.10). Nonetheless, the product with the lowest average in this section is the practicality of the Pakistani commercial office market (M = 3.88). This is still good, but indicates a level of reluctance regarding the local market preparedness, availability of vendors, the cost structure, or conditions of implementation. That is, the respondents seem to be more persuaded of the value of the conceptual sustainability of the system than of its practicality in the Pakistani market in the short-term.

Quantitative Results for Suitability and Barrier Perception

The last quantitative group includes items related to recommendation, solution value, acceptance, awareness barriers, cost barriers, and overall comparison with conventional fixed systems.

Table 4.7: Item-wise results for suitability and barriers

Item	Mean	SD	Agreement (%)
I would recommend moveable prefabricated interior systems for leased commercial offices in Pakistan	4.14	0.88	76.0
These systems offer a realistic solution to both cost and flexibility problems in rented offices	4.06	0.68	80.0
Pakistani clients and office users are likely to accept moveable prefabricated interior systems	3.84	0.87	66.0
Lack of awareness may be a major barrier to adopting such systems in Pakistan	3.92	0.70	72.0
High initial cost may discourage adoption even if long-term benefits exist	4.18	0.72	82.0
Overall, moveable prefabricated interior systems are a better option than conventional fixed interior systems for leased offices	4.20	0.73	82.0

Table 4.7 indicates that the respondents tend to take moveable prefabricated interior systems as an appropriate solution to leased Pakistanese commercial offices. The statement with the highest mean in this section is that these systems are superior to conventional fixed interior systems (M = 4.20) which was agreed by 82.0% of the respondents. The next item that comes close is the perception that high initial cost can discourage adoption (M = 4.18). This implies that the system is being considered positively but the respondents are also aware of economic obstacles that can impede the practical adoption of the system. Acceptance by Pakistani clients and office users (M = 3.84) is

probably the least preferred item. This implies that the respondents are more assured of the benefits of the system than the immediate acceptance of the system in the local market. Thus, the quantitative data show both a positive overall verdict and suggest that the adoption can be influenced by the awareness-building, affordability, and local familiarity.

Overall Quantitative Summary

The numerical results using the data show a definite trend. To begin with, the respondents have a high level of agreement that the leased commercial offices in Pakistan need to be more adaptable in terms of interior solutions since the office layouts keep on changing mainly due to the change in departments, change in branding and the needs of clients. Second, the findings indicate that flexibility and adaptability is the highest dimension related to moveable prefabricated interior systems, then the cost-effectiveness. Quick reconfiguring and ability to support future relocation, minimized downtime, and reuse of interior items are especially appreciated by respondents. Third, the outcomes based on sustainability are also positive, particularly concerning waste reduction and reuse of materials. The obstacles that are most evident include high start-up cost, lack of market preparedness and not knowing whether clients will accept them. It implies that the system is considered as advantageous theoretically and possibly helpful in practice, yet further implementation might need a more enhanced awareness, greater support of the suppliers, and more confidence of the citizens in the stability and long-term economic benefits of the given system.

Qualitative Results

The qualitative data was elicited based on the open-ended part of the questionnaire and examined using the concept of thematic analysis. The data were coded and organized into meaning patterns after reading the responses numerous times. The patterns were then grouped under great themes and sub-themes that illustrated the perception of respondents on the traditional office interior, perception of value of moveable prefabricated interior systems, obstacles to implementation and recommendations to make the same system better in the Pakistani environment.

The analysis generated five major themes:

- Cost burden of conventional interior systems
- Need for flexibility in leased commercial offices
- Perceived advantages of moveable prefabricated interior systems
- Barriers to adoption in Pakistan
- Suggestions for future improvement and implementation

Table 4.8: Summary of qualitative themes and subthemes

Theme	Subthemes
Theme 1: Cost burden of conventional interior systems	Repeated renovation expense; demolition and material waste; loss of investment during relocation
Theme 2: Need for flexibility in leased commercial offices	Frequent layout change; support for organizational growth and downsizing; uncertainty of lease duration
Theme 3: Perceived advantages of moveable prefabricated interior systems	Reusability and cost saving; ease of installation and reconfiguration; better functional planning and sustainability
Theme 4: Barriers to adoption in Pakistan	High initial cost; low awareness and resistance to change; limited local market capacity
Theme 5: Suggestions for improvement and implementation	Awareness through pilot projects; life-cycle cost understanding; local manufacturing and technical support

Theme 1: Cost Burden of Conventional Interior Systems

The initial theme that came out of the qualitative data was the cost implication of the traditional interior systems in rented business offices. The applicability of fixed interior construction in rental settings was continually mentioned as a costly issue by the respondents, particularly where offices need to be changed frequently.

Subtheme 1.1: Repeated Renovation Expense

Most of the respondents noted that traditional interior systems prove to be very costly since each time an office is altered, new workforce, material and finishing has to be done. The participants proposed that the fixed systems can be perceived as manageable initially, but with time it turns out to be costly as you have to incur the expenses every time you need to change space.

This sub theme reveals that cost is not considered by respondents solely based on the initial construction. Rather, they consider expense as an accumulation through repeated changes. In rented business premises, where flexibility is usually typical, respondents deemed this recurring cost a significant drawback of traditional interior systems.

Subtheme 1.2: Demolition and Material Waste

The other good issue brought out by the respondents was the problem of waste related to demolition. Participants defined traditional partitions as wasteful in that they are usually broken, taken away and thrown away before they can be used to the end. This was particularly associated with the reshuffling of the departments, image upgrade, and tenancy transitions.

The responses indicate that waste is not only perceived as an environmental issue, but, also, a financial issue. Tearing down of materials that were still in usable condition was seen as an unwarranted burden to the businesses using leased premises.

Subtheme 1.3: Loss of Investment During Relocation

Another issue was the loss of investment in the fit out as a tenant moves out. In the case of leased offices, respondents noted that tenants can invest heavily in fixed interiors but when he or she moves out of the office then he or she may not be in a position to recoup that investment. This renders permanent interior construction less viable in areas where there is uncertainty of tenancy.

In general, Theme 1 reveals that the respondents perceive traditional interior systems as inappropriate in rented office environments due to their tendency to cause recurring costs and wastage and low long-term value.

Theme 2: Need for Flexibility in Leased Commercial Offices

The second theme of much significance was the significance of flexibility in leased commercial office environments. The respondents repeatedly dwelt on the fact that the rental work places are dynamic and thus necessitate a spatial system that is flexible to the demands of the organization.

Subtheme 2.1: Frequent Layout Change

The respondents said that office interiors tend to change due to a change in teams, departments, work flows as well as due to changing business priorities. In this regard, fixed systems were considered to be slow and inconvenient as compared to flexible systems that were regarded as more practical.

This sub theme echoes the notion that the interior of offices is no longer fixed. The respondents considered layout change as a routine shopping office use as opposed to a special event.

Subtheme 2.2: Support for Organizational Growth and Downsizing

The other area of flexibility that was important was the flexibility to accommodate expansion and downsizing. Other respondents mentioned cases when they needed additional rooms, temporary cabins, or shared areas, whereas others mentioned the necessity to decrease enclosed space or reorganize departments. The flexible interior systems were viewed as more helpful by the respondents as they can adjust to growth and reduction with minimal disturbance.

This demonstrates that operational efficiency is directly related to flexibility. Participants did not simply talk about flexible interiors in aesthetic or design terms, but as instruments that assist workplaces to adjust to actual business change.

Subtheme 2.3: Uncertainty of Lease Duration

Another problem mentioned by respondents was the problem of the undetermined lease period. As the commercial tenants might not stay long in a single office, the participants believed that the interior systems ought to be non-permanent. Rather, they ought to permit movement, re-use and adaptation in various premises.

This sub theme goes a long way in justifying the logic of the research title. The opinions of the respondents indicate that the interior design of leased offices needs to be different when compared to permanent owner-occupied offices.

Theme 3: Perceived Advantages of Moveable Prefabricated Interior Systems

The third theme was the positive attitudes of the respondents towards moveable prefabricated interior systems. These systems were also usually considered to be practical, reusable and more suitable to a leased office setting compared to fixed alternatives.

Subtheme 3.1: Reusability and Cost Saving

One big point that respondents pointed out was that the ability to reuse moveable prefabricated systems through various office reconfigurations. The respondents believed that this would enhance value to money since the same parts can be used on more than one layout or more than one location.

This sub theme supports the notion that cost-effectiveness in leased offices is associated with reuse as opposed to a one-time installation. Reusability was a major strength that was perceived by respondents as what makes moveable systems unique compared to conventional interiors.

Subtheme 3.2: Ease of Installation and Reconfiguration

It was also observed that moveable systems would be more convenient to install, remove, and reconfigure (respondents). This was associated with less interference to office work, quicker project completion and less reliance to intensive demolition work.

This observation implies that the participants would identify moveable systems with sensible continuity at the workplace. Quick reconfigurability was considered as a valuable asset in business settings where productivity is impacted by interruption.

Subtheme 3.3: Better Functional Planning and Sustainability

There are also some answers that suggested the importance of moveable systems in enhancing space planning and sustainability. The participants remarked that these systems can assist in developing meeting rooms, temporary work areas, or collaboration areas more effectively. Simultaneously, they were considered to be more sustainable as they result in less waste and utilize material better.

This subtheme reveals that moveable prefabricated systems are not perceived as a technical solution by respondents. They also consider them as making smarter design and more responsible use of resources.

Theme 4: Barriers to Adoption in Pakistan

Despite the overall positive impression of moveable prefabricated interior systems, significant barriers to implementations in Pakistan appeared in the responses too.

Subtheme 4.1: High Initial Cost

High initial cost was the most referred to obstacle. The respondents also indicated that despite the fact that moveable systems might cost less in the long run, most clients and businesses are interested in short-term costs as opposed to long-term gain.

This shows that even in the local market where the long-term value has been recognised, financial decision-making can be impeding adoption.

Subtheme 4.2: Low Awareness and Resistance to Change

Inadequate awareness was another common problem. A few of the respondents believed that most of the clients, contractors, and even decision-makers are more conversant with conventional interior construction and are thus reluctant to work with newer systems. In this regard, ignorance was regarded as a significant cause of gradual adoption.

According to this subtheme, the problem is not merely technical, but also cultural and informational.

Subtheme 4.3: Limited Local Market Capacity

More practical issues like inadequate vendor availability, non-uniformity, and technical incompetence were also mentioned by the respondents. All these reactions imply that the implementation of moveable prefabricated systems can be reliant on the enhanced supply chain, professional installation, and enhanced availability of local products.

On the whole, Theme 4 demonstrates that even though respondents perceive high potential of the system, they are also aware of barriers to the implementation within the existing Pakistani market.

Summary of Qualitative Findings

The qualitative analysis indicates that the respondents have a clear relation between leased commercial offices and the necessity to have flexible, reusable, and economically efficient interior systems. The results indicate that traditional fixed interiors are perceived as costly, wasteful and not suitable to rental conditions. Conversely, the moveable prefabricated interior systems are viewed as

advantageous as they facilitates reconfiguration, reuse, faster installation, and more environmentally friendly planning of the office. Nonetheless, the analysis also shows that the successful adoption in Pakistan can be curtailed by high initial cost, low awareness and market readiness factors. Combined, these qualitative results provide a strong argument in favor of the notion that the concept of moveable prefabricated interior systems is practically applicable to the context of the rented commercial office in Pakistan, as well as point at the institutional and market-specific circumstances that can potentially influence the further implementation.

Discussion

The discussion of this research indicates that moveable prefabricated interior systems have a high potential to serve as a cost-effective and adaptable solution to leased commercial offices in Pakistan. the most common trend is the perception of flexibility, adaptability and cost savings that is recurringly positive. This is in line with the recent literature that office design has changed post-pandemic to include hybrid work, quick space adjustment and adaptive workplaces as opposed to fixed layouts (Hou et al., 2025; Pan et al., 2024). In this respect, the results can prove the thesis that leased offices need interior systems that can adapt to the varying needs of organizations and space without significant rebuilding.

Among the key study findings, the fact that the flexibility dimension can be very well supported should be mentioned. The findings indicated that the respondents perceived that speed of reconfiguration, accommodation of uncertain lease period, and layout customization were significant benefits of moveable prefabricated systems. This is most in line with the wider adaptability literature, which justifies that adaptable buildings and interiors are worthwhile in that they can accommodate future evolving uses and also save on demolition and rebuilding (Mlote et al., 2024). This is particularly critical in leased commercial offices where team structures, departments and service demands tend to change before the physical existence of traditional partitions has ceased. Hence, the results support the opinion that flexibility is not a mere design choice; it is a functional requirement in rented office spaces.

The second significant theme to be discussed as the result of the study is cost-effectiveness. The results showed that the respondents were in strong agreement that the fixed interior systems should be modified and that the moveable ones can lessen repeated renovation expenses, labour effort and down time. The fact that it broadens the definition of cost beyond initial cost of installation is important. This interpretation is also supported in the literature. The studies of prefabrication emphasize the fact that it can enhance budgets, cut waste, and help to achieve better project results, whereas the research conducted in Pakistan demonstrates that more and more stakeholders see prefabricated buildings as a beneficial method to reduce waste and achieve better performance (Hamza et al., 2023). Similarly, the current research recommends that in the case of leased offices, financial value can be interpreted in terms of life-cycle use, reuse, and less disruption than the one-time fit-out cost alone.

The results are also relevant to the issue of sustainability. The findings indicated a positive consensus that reusable and movable interior systems have the ability to minimize waste during office renovations and aid more sustainable office design. In recent studies, this interpretation is highly justified. The renovation of office interiors is becoming more and more acknowledged as a recurrent and impactful process, and fit-out cycles result in sustainability and health issues in the long term (Chu et al., 2026). Likewise, a research on rentable offices reveals that versatile interior design tactics like open-plan design and portable partitioning can greatly lower waste and embodied energy loss throughout the numerous renovations. This implies that this current research both justifies moveable prefabricated interiors as a business solution, but also as more environmentally responsible design solution to commercial tenancy conditions.

Another significant aspect of the discussion is that the results do not project moveable prefabricated systems as not subject to challenge. Although the outcomes were positive in general, in Pakistan, the most noticeable are high initial investment, low awareness and market preparedness issues. This outcome is well supported by Pakistan-specific prefabrication literature, which considers obstacles like the shortage of skilled workers, the lack of infrastructure, restrictions in the policies, and issues connected with the investments despite the evident understanding of the advantages of the technology (Hamza et al., 2023; Hassan et al., 2024). Thus, the discussion indicates that the problem in Pakistan is not whether the system would theoretically be useful or not, but whether the market, suppliers, and the decision-makers would be willing to implement it in a larger scale. That is, acceptance can be subjected to showcase projects, professional training and closer-knit supply assurance.

The results also suggest that relocatable prefabricated interior systems are particularly applicable in the cases when the change is common and permanence is uncertain. This is supported by the literature on demountable systems of partitioning and design to disassemble, demonstrating that removable and modular interior elements can be reassembled, disassembled, and reused as many times as possible without functional performance being compromised and minimal waste being produced (Jorge et al., 2023; Ostapska et al., 2024). This is related to the point in the argument of the study, which is that there should not always be the same logic applied to designing leased offices as to permanent spaces that are owned by the owner. Rather, the office interiors of leased environments are to be designed as mobile systems retaining value, as well as reversible and reused. In this light, relocable prefabricated interiors may be perceived as an economic and strategic answer to tenancy insecurity.

Conclusion

The study investigated the possibilities of the moveable prefabricated interior system as an economical and adaptable solution to the leased commercial offices in Pakistan. The research was created on the premise that rented office settings are intrinsically different compared to permanent owner-occupied areas since they are subjected to more changes in terms of relocation, departmental reorganizations, staff growth, evolving customer needs, and periodic rebranding or a

redesign. Traditional fixed interior systems, in these environments, tend to impose unneeded financial strain, re-renovation efforts, waste, and inflexibility. The general results of this research point out that movable prefabricated interior systems provide a viable alternative in that office interiors can be repurposed, reconfigured and altered with less disturbance and reduced long-term loss.

As demonstrated in the study, flexibility and adaptability is the most powerful value of these systems. Leased business offices require interior systems capable of adapting swiftly to shifting demands, and mobile systems seem to fit the bill than fixed building construction. Simultaneously, the study has also underscored the cost-related advantages of such systems especially in terms of saving repeated fit-out costs, curbing demolition work, decreasing down time, and enhancing reuse over a series of office changeovers. Besides, the research also highlighted that such systems could also help in waste minimization and more sustainable office design, particularly in an environment where the interiors are changed regularly.

Concurrently, the study also identified that there might be some obstacles to adoption in Pakistan, such as high initial cost, lack of awareness, and perceptions on the readiness of the local market, availability of suppliers and technical know-how. These issues imply that the concept has a great potential, but its broader application needs greater industry awareness, professional acceptance and facilitation of local production and implementation. this paper concludes that the moveable prefabricated interior system has a big relevance to leased commercial offices in Pakistan in that it directly addresses the key requirements of the leased office offices namely: cost-efficiency, design flexibility and practical adaptability.

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