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Factors Influencing the Adoption of Workplace Acoustic Solutions in Saudi Arabia: A Qualitative Study of Industry Professionals

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Abstract

In Saudi Arabia, the demand for modern workplaces resulting from the country's national diversification programmes has been fuelled by the rapid commercial building, while the acoustic performance of office spaces has remained an under-researched aspect of office design. This research examines the motivating factors and barriers for specifying acoustic solutions in the commercial office sector in Saudi Arabia and aims to answer two research questions: What factors do decision makers consider when specifying acoustic solutions and what are the barriers faced when implementing it? The qualitative interpretivist design was used. Eight participants (P1–P8) were selected by a purposive sampling technique from the entire specification chain in the Saudi market. Seven were involved in semi-structured interviews and one answered in writing. Braun and Clarke's (2006) six-phase thematic analysis was used to analyse the data, which were then interpreted considering Innovation Diffusion Theory (Rogers, 2003) and Institutional Theory (DiMaggio & Powell, 1983; Meyer et al., 2009). Two research questions were answered, leading to identification of eight themes. Cost was the most important factor for all participants and was always decisive where compromises had to be made. The intangibility of acoustic performance (that is, the difficulty of demonstrating an acoustic benefit before it is installed) was a major obstacle amongst other factors such as lack of client awareness and budget constraints at the end of the project. Adoption, on the other hand, seemed to be determined more by the institutional environment in which specification decisions are made than by the products themselves. Where regulatory pressure is low, cost becomes the default basis for decision making. The study offers an integrated diffusion–institutional account, as institutional conditions influence whether the perceived attributes of an innovation, specifically the observability, are established or not, and also offers guidance for manufacturers and specifiers where cost sensitivity is high and the regulatory pressure is low.

Keywords: Acoustic Solutions, Workplace Design, Innovation Diffusion Theory, Institutional Theory, Saudi Arabia

Introduction

The workplace design has changed from being about simply space efficient to one where employee wellbeing and organisational performance are considered. Indoor environmental quality (IEQ) is therefore receiving increasing attention in contemporary offices, including lighting, air quality, thermal comfort and acoustics (Fisk, 2000; World Green Building Council [WGBC], 2014). Acoustic comfort, related to noise control, sound absorption and speech privacy in shared workplaces (Delle Macchie et al., 2018), is one of the most important and least well specified of these attributes. Difficulty concentrating and stress, and even lower job satisfaction (Evans & Johnson, 2000; Jahncke et al., 2011; Lee & Jeon, 2016; Smith-Jackson & Klein, 2009), have been consistently found to be linked to poor acoustics, and especially intelligible speech from co-workers in open plan offices. A survey of 303 office buildings by Kim and de Dear (2013) found over 42,000 of the buildings' occupants were dissatisfied with noise and poor speech privacy.

However, in spite of such evidence, acoustic solutions are not always included in commercial office projects and the factors that promote or hinder their use in commercial projects by professionals are not generally recognized. This is particularly true of Saudi Arabia. The reform programme, called Vision 2030, was launched in 2016 (Moshashai et al., 2020) and has driven large-scale commercial real estate development, including new business districts and the growth of Riyadh as a regional hub, which has created demand for internationally competitive office environments. The perception, value and specification of acoustic solutions in the rapidly changing market have been little studied from a scholarly point of view. Existing evidence of acoustic adoption is primarily from markets where there is existing regulation, certification schemes and professional standards, for example in the United Kingdom and the United States (BRE Global, n.d.; U.S. General Services Administration [GSA], 2011); and assumptions made from these environments may not apply to the Saudi institutional and professional context (Meyer et al., 2009).

To fill that gap, this study investigates the factors that are considered as priorities during acoustic decision making on commercial office projects in Saudi Arabia as experienced by the professional industry and the difficulties facing the adoption. The study aims and research questions are listed below. Theoretically, the study asks how Innovation Diffusion Theory and Institutional Theory can be combined to explain these decisions. Diffusion theory accounts for how individual professionals perceive an innovation, while institutional theory accounts for the conditions in which those perceptions form and are acted upon. The results of the interviews are analysed in light of the interaction of these two perspectives in a market where specification decisions are shared between several actors.

Research Objectives

This study aims to:

- RO1: Understand what acoustic solutions and workplace design professionals in Saudi Arabia consider to be priorities in the design decisions of their commercial office projects.
- RO2: Explore the workplace design challenges that professionals in Saudi Arabia face which impact the uptake of acoustic solutions in commercial offices.

- RO3: Develop a contextual understanding of the acoustic adoption decision-making process in the Saudi Arabian commercial office sector, based on the professional experiences and views of industry practitioners.

Research Questions

This study seeks to answer the following research questions:

- RQ1: What are the factors that are prioritised during workplace design decision-making involving acoustics?
- RQ2: What are the workplace design challenges that influence the adoption of acoustic solutions?

Literature Review

Adoption of Workplace Acoustic Solutions

For the purposes of this study, adoption is the choice of an acoustic consultant, interior designer or other industry practitioner to specify, advocate, buy, or integrate acoustic solutions into a commercial office building project. This is consistent with the general innovation literature in which adoption is considered a conscious choice influenced by the perceived utility and by professional norms and contextual pressures (Rogers, 2003). Technical merit and objective need is not the only basis for adoption. The awareness of the problem, perception of viable solutions, client priorities, cost and institutional drivers – including certification requirements – all contribute, and awareness of a benefit is not sufficient to ensure that the solution is adopted (Robichaud & Anantatmula, 2011).

Formal institutional supports are the ones which in mature markets normalise acoustic specification. The BREEAM scheme has a specific acoustic criteria listed under its Health and Wellbeing category (BRE Global, n.d.), the WELL Building Standard and LEED both have included acoustic requirements (International WELL Building Institute [IWBI], 2020; U.S. Green Building Council [USGBC], 2019), ISO 22955:2021 has established acoustic quality requirements for open offices, and the U.S. General Services Administration has published guidance on acoustic comfort in modern offices (U.S. General Services Administration [U.S. GSA], 2011). Where such supports are not well developed, adoption will probably rely more on individual professional skills and client awareness, and thus be more variable and project specific (Meyer et al., 2009).

Factors Influencing Acoustic Decision-Making

In the literature there are four factors that recur. Awareness of acoustic comfort, both technical (such as sound absorption and speech intelligibility) and outcome-related (the relationship of acoustics and concentration, stress and productivity) is a prerequisite for action, and limited product literacy among clients and specifiers has been shown to be a barrier to innovative building solutions (Hwang & Tan, 2012). Employee wellbeing has become more prominent in corporate workplace strategies (Danna & Griffin, 1999), and the evidence linking acoustic exposure to stress, health and job satisfaction is substantial (Evans & Johnson, 2000; Lee & Jeon, 2016; Smith-Jackson & Klein, 2009). Cost is among the most consistently documented considerations in adopting innovative building solutions. Hwang and Tan (2012) found that cost premium remained the most frequently cited barrier even among sustainability-committed clients, and the WGBC (2014) argues that productivity and wellbeing benefits can far exceed the cost of the investment, which suggests that the challenge is one

of communication and value framing as well as evidence. Finally, sustainability and green building certification link acoustic performance to procurement through schemes such as BREEAM, LEED and WELL, although sustainability motivation alone rarely drives adoption without clear performance and cost evidence (Robichaud & Anantatmula, 2011).

Challenges Influencing Acoustic Adoption

Three sets of challenges are suggested by the literature. The first is institutional and regulatory: when acoustic specification is not recognized as legitimate through regulation, professional guidance or certification, its pressure to be adopted is weak, and its case for acoustics needs to be argued on every project (DiMaggio & Powell, 1983; Meyer et al., 2009). The second is the lack of consistency in professional knowledge, where the designers lack the necessary knowledge to proactively determine acoustical solutions and clients lack the ability to describe acoustical requirements (Hwang & Tan, 2012). The third concerns client priority and budget allocation. Where the link between acoustic conditions and business outcomes is not understood, acoustic specification becomes an easy target during cost reduction. Acoustic quality also cannot be seen in a drawing or render, so it is harder to justify at the design stage when budgets are set.

Theoretical Underpinnings

The findings are presented from two complementary perspectives in the interpretation of the results. Innovation Diffusion Theory (IDT; Rogers, 2003) suggests that the rate and extent of adoption is influenced by five perceived attributes of an innovation, namely relative advantage, compatibility, complexity, trialability and observability. For acoustic solutions, IDT suggests that adoption is more likely where a clear performance benefit is perceived, where solutions fit existing specification workflows, and where outcomes can be demonstrated. IDT also suits qualitative enquiry because it directs attention to on subjective perception and social influence.

In addition to rational market calculation, Institutional Theory also suggests that the institutional context (e.g. regulation, professional norms, certification requirements and the degree of legitimacy of practices) will affect organisational behaviour (DiMaggio & Powell, 1983; Scott, 2014). In emergent economies, the level of such supports affects specialist products' adoption (Meyer et al., 2009). The theory therefore draws attention to both individual perceptions and the structural context in which practitioners operate.

Integrating Diffusion and Institutional Perspectives

Both theories are related to the same decision but on different levels. The Innovation Diffusion Theory is adopter-centred, describing how the individual's perception of the innovation explains adoption, and acknowledging the roles of social systems, opinion leaders and change agents (Rogers, 2003). It does not explain the systematic difference in perceptions of the same innovation across markets, or the rules and standards that enable the development of some attributes more easily than others. Institutional Theory is context-centred in that it suggests that practices are legitimate and expected through regulation, professional norms and certification (DiMaggio & Powell, 1983; Scott, 2014), but provides little insight into the perceptual process through which an individual specifier decides on a particular product. Meyer et al. (2009) argue that institutions shape which strategies firms

pursue in emerging economies, which suggests that the perceptual and institutional levels should be examined together in such settings.

The two are integrated to provide an analytic framework with three links that will guide analysis. First, perceived attributes are institutionally conditioned: the advantage of an innovation is observable only if there is external verification of performance in the form of standards, certification and/or regulation (e.g., BRE Global, n.d.; ISO, 2021). Second, the three institutional pressures identified by DiMaggio and Powell (1983), coercive, normative and mimetic, act as channels through which attributes come to be evaluated and diffused: regulation and certification (coercive), professional education and association norms (normative), and the imitation of international clients and consultants (mimetic). Third, adoption in a construction supply chain is not the decision of a single adopter. Designers, clients, contractors and suppliers hold different positions and incentives, so institutional conditions influence whose perception prevails. The Discussion examines how the interview data bear on each link.

Methodology

Research Design

In terms of the study philosophy, it was interpretivist and the approach adopted was inductive (Saunders et al., 2019) with the study design being mono-method qualitative and the study strategy being semi-structured interviews. The choice of acoustic solution is not a simple rational or measurable process, but is shaped by professional norms, client relationships, budgets and institutional conditions: for this reason, it is appropriate to adopt interpretivism. These were exploratory questions, and designed to uncover priorities and challenges rather than to test hypotheses. The data was gathered at one time (cross sectional).

Sampling and Participants

Participants were selected using purposive sampling, which allowed for the selection of individuals with first-hand experience in acoustic specification, consultancy and/or supply in the Saudi commercial office sector. All participants had to be currently employed or have a recent significant background in the acoustic solutions or commercial workplace design industry in Saudi Arabia, and be prepared to participate in an online interview (recorded). The researcher's professional network was the main source of recruitment, with LinkedIn and professional channels used as a secondary source. Eight participants (P1–P8) participated within the timeframe available, seven of whom were interviewed and one (P8) who could not be interviewed due to time constraints who provided written responses to the same questions. Themes were identified by many different participants, suggesting that thematic saturation was well achieved, which is typical for relatively homogeneous samples, where most themes are usually found from the first 6–12 interviews (Guest et al., 2006). Consultancy, manufacturing, distribution, contracting and design (Table 1) are all included in the sample.

Table 1
Demographic Profile of Participants

Participant	Professional Role	Organisation Type	Experience	Market Position
P1	Sales / business professional	Acoustic materials manufacturer	22 yrs in region; 7–8 in acoustics	Supply side
P2	Business owner	Acoustic distribution and installation firm	11–12 yrs in region	Supply and installation
P3	Regional Specification Manager	Building materials manufacturer	20+ yrs	Supply / specification
P4	Owner and CEO	Acoustic solutions manufacturer	Extensive (Europe, US, Middle East)	Supply side
P5	Architect and company owner	Multidisciplinary design firm	UK-trained, experienced	Design side
P6	Acoustic consultant and contractor	Own consultancy and construction firm	In Saudi since 2022; acoustics degree	Consultancy and contracting
P7	Product and business development specialist (acoustic ceilings/sprays)	Acoustic materials manufacturer / supplier	15 yrs in GCC acoustics	Supply side
P8	Acoustic consultant and Partner (Head of Strategic Projects); written response	Independent acoustic consultancy	International; workplace, hospitality and cultural projects	Consultancy / design side

Note: Organisation names are redacted to protect anonymity.

Data Collection and Processing

A set of 10 open-ended questions were designed from the literature and structured around the two research questions, starting with background questions and followed by questions on decision factors and adoption challenges, and including optional probes. Interviews were carried out individually using Microsoft Teams, which yields data of comparable quality to face-to-face interviews and offers scheduling flexibility (Deakin & Wakefield, 2014). The interviews were conducted in English, lasted for 30–45 minutes, and were audio-recorded with the consent of the informants. All recordings were transcribed verbatim using transcription software with manual corrections against the recordings and anonymised and coded as P1 to P8. Participant P8's written responses were treated and coded in a similar way to the transcripts.

Data Analysis

The data were analysed in the six phases of thematic analysis of Braun and Clarke (2006): familiarisation with the data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and writing up. Structured template in Microsoft Word was used for coding, and codes and themes were documented in a separate codebook to ensure transparency and auditing purposes (Nowell et al., 2017). Themes were developed inductively and then organised around the two research questions, and Innovation Diffusion Theory and Institutional Theory were used to interpret them.

Ethical Considerations

Ethical guidelines adopted in the study were those from the British Educational Research Association (BERA, 2018) and the guidelines of the institutions. Each participant was provided with a written information sheet and provided verbal informed consent and informed consent for audio recording prior to each interview. Participation was voluntary, and participants could withdraw at any time without penalty. The participants were coded and identifying information was omitted and kept in a secure location protected by a password.

Findings

For both research questions, eight themes were identified. Table 2 provides a summary of themes and sub-themes and the participants who helped develop each theme. The quotations by the participant(s) are presented exactly as they appeared in the interview transcriptions.

Table 2
Themes and Sub-themes for RQ1 and RQ2

RQ	Theme	Sub-theme	Participants
RQ1	Cost as the dominant driver	Cost as primary deciding factor	P1, P2, P3, P4, P5, P6, P7, P8
		Availability of cheaper alternatives	P2, P6, P7
	Design intent and aesthetics	Design concept drives selection	P3, P6, P7, P8
		Aesthetics balanced with function	P2, P4, P5, P6, P8
	Employee wellbeing	Wellbeing as emerging driver	P1, P4, P8
		Wellbeing as reactive / secondary	P2, P3, P6, P7
	Sustainability and certification	Certification-driven adoption	P1, P2, P4, P7, P8
		Limited / government-only influence	P3, P6
RQ2	Awareness and knowledge gaps	Client awareness gap	P1, P2, P3, P4, P6, P8
		Professional / architect knowledge gap	P3, P5, P6, P7
	Cost perception and late-stage budgeting	Acoustics seen as omittable cost	P3, P4, P8
		Budget exhausted by project end	P3, P4, P6, P7, P8
	Market maturity and supply chain constraints	Product availability / procurement	P5, P6, P7, P8
		Technical capability of suppliers	P6, P8
	Intangibility of acoustic performance	Cannot be seen, so undervalued	P3, P5, P6, P7, P8

RQ1: Factors Prioritised in Acoustic Decision-Making

Cost as the Dominant Driver

Cost was the most frequently cited factor and was raised by all eight participants. It was described not as one consideration among many but as the determining factor in whether and how acoustic solutions are adopted. P6, who works on both the consultancy and contracting sides, said, "I will say the first one is cost. Forever will be cost. I don't see this change at least here." P3 described its role as "Big, really big, big, very, very major," explaining that a design concept sets the direction but "what solution is the final one is by cost. So its initial is design and the final is cost." P1 added a cultural dimension: "cost plays a very significant role, but also culturally, that's just how things work in this part of the world."

A related sub-theme was the growing availability of lower-cost alternatives such as acoustic spray and PET panels, which has intensified price competition. P6 explained that clients frequently opt for a cheaper solution even where a more expensive one was originally proposed: "You are proposing like a wood texture, but then the competitor comes with a fraction of the cost proposing like a spray. So it's important to them, the functionality, and maybe you lose on aesthetics." P1 saw a downside: "you keep seeing cheaper sort of solutions being flooded into the market every year. And yeah, I mean, the quality is lower."

Design Intent and Aesthetics

Design intent was the second most prominent factor, particularly for participants on the design and specification side (P3, P6, P7, P8). The design vision for a space is among the first things to shape which acoustic solutions are considered. P2 said, "Ultimately, the most important factor would be the design intent, I would say." Participants described aesthetics and function as needing to be balanced rather than traded off. P6 noted that, with the range of solutions now available, functionality is rarely compromised outright; the compromise falls between aesthetics and cost. P4 observed that "clients expect the both function and aesthetic properties," indicating a market expectation that acoustic products must perform technically while satisfying visual design requirements.

Employee Wellbeing

Views on wellbeing diverged. For P1, P4 and P8 it is a growing influence. P4 said, "In the past few years, it has become much more important, of course. Companies understand that employees work better when there is less noise." P1 linked the weight given to wellbeing to the type of client: "if they're a renowned multinational company, like headquarters overseas, and then they have to follow sort of the rules and regulations from coming from overseas, then employee well-being will definitely be taken into consideration."

Others described wellbeing as secondary or reactive (P2, P3, P6, P7). Asked how far wellbeing influences investment, P3 answered, "Hardly, hardly, not much," arguing that although wellbeing is the ultimate purpose of acoustic treatment, acoustics at the design stage is treated as a standard: "It's done because it has to be done." P6 described wellbeing as a driver that only activates once discomfort becomes a tangible problem: "They will not spend money if there is not, if there is no complaint, there is no problem, they will not spend money." Wellbeing therefore appears to operate as a latent driver, widely acknowledged in principle but frequently acted upon only reactively.

Sustainability and Certification

Sustainability and certification were contested. P1, P2, P4, P7 and P8 saw them as increasingly significant. P1 linked this to government policy, noting that "building initiatives have started to play a big role now in Saudi because they become part of the government directive for building material codes." P4 reported that developers look for recycled material and products that support green building certification, and P2 described sustainability documentation such as environmental product declarations and VOC testing as "massive green ticks."

P3 and P6 viewed the link between certification and acoustics as weak or limited. P3 stated, "linking it to acoustics because you're doing LEED and you need to do acoustics, the link is still not there. That much of education is not there in the market yet." P6 was sharper: "I will say for private projects, none whatsoever. I did not see this around here, only for governmental and royal projects." He attributed this to foreign consultants and the government's positioning on such projects and expected the practice to spread to the private sector over time.

RQ2: Challenges Influencing Acoustic Adoption

Awareness and Knowledge Gaps

Awareness and knowledge gaps were raised by all eight participants, at the level of the client, the professional, or both (Table 2). Clients were described as often regarding acoustics as an add-on rather than a requirement. P4 identified this as the fundamental barrier: "the biggest challenge is awareness right now at this stage," with some clients still viewing "the acoustics as an extra cost instead of investment." P6 described spending three months persuading a main contractor that a ceiling they had specified as acoustic was an aluminium ceiling that provided no sound absorption, and judged awareness in Saudi Arabia to be "still on the bottom side if you compare to other countries," although improving.

At the professional level, P3, who has lectured at universities, was emphatic: "Architects don't study acoustics. It was shocking to know." He argued that "the biggest link is information know-how." P5, the sole architect in the sample, corroborated this from within the profession: "designers are aware of acoustics. A lot are not aware of the applications and how you can do it," while "clients have very little awareness of, you know, acoustic requirements technically or materials available." The gap therefore appears to be structural and educational rather than merely a marketing challenge.

Cost Perception and Late-Stage Budgeting

Two related problems emerged: acoustics seen as an omittable expense (P3, P4, P8) and budgets exhausted or underestimated by the time acoustic work is due (P3, P4, P6, P7, P8). P3 explained that "because it cannot be seen, it's easy to avoid it, easy to easily omit it." Acoustic work also sits late in the project sequence: "our solutions come in the end. It's the last thing which goes in the building. By that time, all the funds are really tight. They're exhausted, they're over the budget." P4 similarly noted that acoustics is often "considered too late in the project when budget is already fixed."

P6 added the contracting perspective. Main contractors often lack in-house specialists and underestimate acoustic costs at the bidding stage, as in projects where "we quoted 200, 250 and they were expecting 20% of that." Clients who decline acoustic treatment often return

later, at greater cost: “Give them one year, 18 months, they are coming back and saying, we have a problem, how much you cost,” by which time the work has become a retrofit. P8 made the same point: retrofitting after completion is usually more expensive and less effective than early acoustic engineering.

Market Maturity and Supply Chain Constraints

Participants with direct execution experience (P5, P6, P7, P8) raised the maturity of the Saudi acoustic market itself. P5 said that after cost, “the second biggest problem is availability and procurement,” compounded by shipping difficulties. P6 and P8 raised supplier capability. P6 described a market with “a lot of re-vendors, resellers, people who know how to apply but don’t understand the nuances of small problems or details,” which can produce unsatisfactory results. He also reported that, over two years, the technical component of tender evaluations had risen from around 10% to 20–25% of the weighting, which he read as a sign that poor outcomes are gradually raising standards and that the market is becoming more aware.

The Intangibility of Acoustic Performance

A cross-cutting theme, raised by P3, P5, P6, P7 and P8, was that acoustic quality cannot be seen and its benefits are experienced rather than visually demonstrated, making it harder to justify and easier to overlook. P5 framed this as a cost-to-value problem: “Clients doesn’t understand that what’s the value of a quiet office space.” P6 linked intangibility to the reactive pattern of adoption, with clients recognising the value of acoustic treatment only after experiencing the problem of its absence. Intangibility appears to underlie several other challenges: it makes acoustics harder to value (feeding the cost barrier), harder to understand (feeding the awareness barrier) and easier to cut from budgets (feeding the late-stage budgeting barrier).

A Contextual Understanding of the Decision-Making Process (RO3)

The overall context of the accounts indicates a definite sequence. Acoustic solutions are typically chosen within a design intent that establishes the overall aesthetic, leaving the cost as the last criterion for choosing between the different solutions available. Acoustic work is often last on the project list when the financial resources are either exhausted or under budgeted, or the issues are dealt with after moving in. Wellbeing and sustainability as drivers come in primarily as conditional factors which are dependent on the client and project type. The two common themes emerging from the interviews are that cost and awareness are twin pillars driving adoption and that the market is moving into a transition phase, buoyed by the development of Vision 2030 and the introduction of international expertise and standards but still hindered by structural, educational and perceptual challenges. The theoretical significance of these patterns is examined in the Discussion (Table 3).

Discussion

The main insight gained is that the characteristics of acoustic products have less impact than the way the decisions are made. The cost was emphasized by all the participants, which aligns with literature on cost-sensitivity of introduction of innovative solutions for buildings (Hwang & Tan, 2012). The Saudi data add three nuances. First, P1 attributed cost sensitivity partly to regional business norms rather than to price alone. Second, lower-cost alternatives were reported to enable adoption while at times undermining quality. Third, the way cost operates was largely a matter of sequencing: because acoustic work comes last, it meets budgets that

have already been spent. The interpretation of this finding is presented below under each theory and then under both the theories together.

Diffusion Perspective

Through the lens of Innovation Diffusion Theory, the intangibility theme can be read as a problem of low observability and uncertain relative advantage. If the benefit of acoustic treatment cannot be seen before installation, the perceived relative advantage over the cheaper alternative is difficult to establish, and the trialability of acoustic solutions is limited, since the experience of their absence is typically what finally persuades clients, as P6's account of clients returning after a year suggests. The importance participants attached to design intent can be read as compatibility: solutions are adopted when they fit the prevailing design vision and specification workflow. These readings are interpretive, but they indicate why adoption depended less on proof of acoustic performance than on fit with design and budget.

Institutional Perspective

Institutional Theory helps to explain why cost becomes the default criterion. DiMaggio and Powell (1983) argue that organisations conform to practices that are institutionally legitimated. Where acoustic specification has not yet gained legitimacy through regulation, professional education or certification requirements, the pressure to adopt is weak and the case must be argued afresh on each project (Meyer et al., 2009; Scott, 2014). The participants' accounts fit this reading. Sustainability requirements were described as strong in government, royal and multinational-linked projects but largely absent in private commercial projects, wellbeing was described as being prioritised mainly by multinational clients that carry standards from overseas, and P5 expected that more stringent requirements from the authorities “would definitely drive that.” The recurring distinction between government and private projects points to the role of state-driven institutional pressure, consistent with the Vision 2030 reform context (Moshashai et al., 2020), and suggests that adoption diffuses first through government and internationally connected projects before reaching the private sector unevenly.

How the Two Perspectives Combine

Each theory explains a portion of the pattern, read independently. Together, they explain why the same product attributes lead to different adoption outcomes in different institutional settings. Table 3 sets out how the interview findings bear on each attribute of Innovation Diffusion Theory, the institutional condition surrounding it, and the insight that results from combining them.

Table 3
Contribution of the Interview Findings to the Integrated Framework

Concept	What participants reported	Institutional condition	Combined insight
Observability and trialability	Acoustic quality "cannot be seen" (P3, P5, P6, P7, P8); value recognised only after problems appear, when clients return for retrofit (P6)	Limited external verification in private projects: certification link described as weak (P3, P6); call for comfort-based guidance from authorities (P5)	Where no institutional verification substitutes for observability, the benefit stays abstract at the point of decision and is exposed to cost cutting
Relative advantage	Judged mainly on cost; cheaper alternatives displace specified products (P2, P6, P7); cost is the final decider (P3, P6)	Weak coercive pressure: no widely applied minimum acoustic requirement; tender weighting heavily on cost, with the technical share rising from about 10% to 20–25% (P6)	With no external benchmark, price becomes the default yardstick for relative advantage; rising technical weighting is an early sign of institutionalisation
Compatibility	Solutions chosen within design intent; aesthetics balanced with function (P2, P3, P4, P5, P6, P8)	Designers act as gatekeepers but receive little acoustic education (P3, P5)	Compatibility is with the design vision rather than with acoustic need, so acoustics is fitted to the design instead of shaping it
Knowledge and complexity	Client awareness gap (P1, P2, P3, P4, P6, P8); professional knowledge gap (P3, P5, P6, P7); limited supplier capability (P6, P8)	Weak normative pressure: acoustics largely absent from architectural education and from in-house design teams (P3, P5, P7)	The awareness barrier is institutional as well as informational; suppliers carry the knowledge that education and professional bodies do not (P1, P2, P3, P4)
Opinion leaders and diffusion path	Uptake stronger in government, royal and multinational-linked projects with foreign consultants (P1, P4, P6); wellbeing prioritised mainly by multinational clients (P1)	Coercive pressure (government directives) and mimetic pressure (imported international standards and practice)	Diffusion is led by coercive and mimetic channels ahead of normative ones, and reaches the private sector unevenly
Locus of the adoption decision	Designers and consultants specify, but contractors and suppliers substitute or reprice (P1, P6, P7); acoustic budgets exhausted by the end of the project (P3, P4, P6)	Procurement sequence places acoustic work last, and weak requirements leave specifications open to value engineering	Adoption is decided along the specification chain, and in the absence of requirements the actor closest to the budget prevails

Note: Interpretive synthesis; participant codes show where each point was raised.

First, the findings show that institutional conditions determine whether the benefit of acoustic solutions can be made observable. Innovation Diffusion Theory treats observability as a property of the innovation, and acoustic performance is inherently low in observability because it is experienced rather than seen. The interviews indicate that what matters is whether the institutional environment supplies a substitute. If measurable acoustic criteria can be included in standards and certification, such as those from BRE Global (n.d.), ISO (2021) and the U.S. Green Building Council (2019), performance can be verified and specified. For private Saudi projects (P3, P6) participants indicated that this link was weak, and P5 recommended guidance on requirements for noise comfort in various situations. If not, observability is only delivered as the client experiences it, after installation or after the client complains, as P6 put it. On this reading, intangibility is less a property of a product, and more an institutional shortfall – a lack of verification that renders an intangible benefit a hurdle.

Secondly, the combination is responsible for the fact that cost is the default decision rule. In diffusion terms, relative advantage is determined by comparing against alternatives. The cheaper alternatives replace specified products (P2, P6, P7) and the cost is the ultimate determinant (P3, P6). In other words, where there is no regulation or standard to establish a lowest acceptable acoustic performance, there is no external pressure of relative advantage other than price, which is a relatively weak coercive pressure, according to DiMaggio and Powell (1983). The P6 report, however, indicated that the technical component of the tender evaluation process had increased from approximately 10% to 20–25% in two years, which suggests the market is beginning to build a technical criterion into procurement itself. This points to a proposition for later testing: as institutional benchmarks for acoustic performance strengthen, relative advantage should be judged less on cost alone.

Third, institutional pressures appear to act as carriers of diffusion. Innovation Diffusion Theory emphasises opinion leaders and change agents, and the Saudi data indicate who they are. Government directives (P1), government and royal projects designed by foreign consultants (P6), and multinational clients bringing overseas standards (P1) were described as the settings in which sustainability and wellbeing considerations are taken up, while the private commercial market lags behind. This corresponds to coercive pressure (government directives) and mimetic pressure (imported international practice). Normative pressure, which would come from professional education and association guidance, appears weakest: “Architects don’t study acoustics” (P3). Suppliers have partly filled this gap by taking on an educational role (P1, P2, P3, P4). The contribution is a more specific picture of how diffusion proceeds where institutional supports are uneven, with coercive and mimetic channels leading and normative channels developing later.

Fourth, the findings qualify the assumption of a single adopter. Innovation Diffusion Theory is usually applied to an individual or an organisation deciding whether to adopt. Here the decision was distributed along the specification chain: designers and consultants specify, contractors and cost consultants control the budget, and suppliers influence both (P1, P6, P7). Late-stage budgeting (P3, P4, P6) and value engineering (P7) show that a specified solution can be replaced at a later stage by an actor with different incentives. Institutional conditions determine whose perception prevails, and where requirements are weak it is that of the actor

closest to the budget. For diffusion theory, this implies that adoption in project-based sectors is better analysed at the level of the specification chain than at the level of the individual adopter.

If combined, these four points demonstrate the added value of the combination. Innovation Diffusion Theory alone would point towards improving the perceived attributes of acoustic products (for example, through demonstrations and trials), and Institutional Theory alone would point towards regulation. Having the two together in an integrated account suggests that both will be most effective combined, with demonstration being most useful in so far as the decision can be tied to a known benchmark, and regulation only if the actors who perceive and purchase understand what the benchmark means. The interpretations are based on eight interviews and are proposed as hypotheses that can be explored rather than statements that represent conclusions.

Beyond explaining the findings, the integration of Innovation Diffusion Theory and Institutional Theory generates insights that neither perspective could provide independently. Innovation Diffusion Theory would suggest that acoustic solutions struggle because their benefits are difficult to observe and demonstrate to potential adopters. Institutional Theory would suggest that weak regulatory requirements and professional norms reduce incentives for adoption. The interview findings indicate that these explanations are interconnected rather than separate. Specifically, the observability of acoustic performance is itself shaped by institutional conditions. In the absence of regulations, certification requirements, or recognised performance benchmarks, decision makers have limited means of evaluating acoustic benefits before installation, causing cost to become the dominant selection criterion. The findings therefore extend existing theory by demonstrating how institutional conditions influence the practical operation of diffusion attributes, particularly observability and relative advantage, within a project-based construction environment.

The findings also qualify the wellbeing literature. Although the relationship between acoustic conditions and stress, health and satisfaction is well understood (Evans & Johnson, 2000; Lee & Jeon, 2016; Smith-Jackson & Klein, 2009), the interviews indicated that this evidence is yet to be fully translated into proactive decisions in the Saudi commercial market. This is consistent with the known fact that having awareness of a good or service doesn't ensure that the good or service will be taken up (Robichaud & Anantatmula, 2011). Last, awareness is a theme that supports the argument that professional education is a prerequisite for market development, not a marketing activity: a limited acoustic training of the architects as reported by a supplier (P3) and an architect (P5) puts the barrier of awareness in professional education.

Implications

Theoretical Implications

The study extends the discussion of acoustic adoption into a context that has been largely overlooked, and shows that while much of the Western-focused literature applies broadly (cost sensitivity, awareness gaps and the intangibility of acoustic performance), the Saudi context adds nuances: the reinforcing effect of regional business norms on cost sensitivity, the pronounced difference between government and private projects in sustainability-driven adoption, and the role of imported international standards in wellbeing-driven decisions. The

main theoretical contribution is an integrated diffusion–institutional account (Table 3). The attributes of the innovation that are perceived, such as observability and relative advantage, can be determined by institutional conditions; institutional pressures are the carriers by which the diffusion takes place; and in project-based sectors the unit of adoption is the specification chain, not the individual adopter. For Innovation Diffusion Theory, the findings show that observability can be supplied or withheld by the institutional environment rather than being a fixed property of the innovation. For Institutional Theory, they show how pressures operate at the level of the individual specification decision, and how these pressures can build up in uneven ways, in which the coercive and mimetic forces are more influential than the forces of norms.

Practical Implications

Based on the ideas participants gave, five implications are listed. First, there is a need for continued investment in professional education and client awareness – more extensive acoustic content within architectural and design curricula, and continued professional development; and strategic client education for manufacturers and suppliers, not as a side-benefit of sales. Secondly, acoustics should be considered from the beginning, to ensure that acoustic requirements are anticipated and costed, which reduces the risk of exhausted budgets and costly retrofits. Third, acoustic value should be made more real by demonstration, acoustic modelling, post-occupancy evaluation, and case studies. Fourth, local supply chains and the technical capability of suppliers and applicators should be strengthened. Finally, policymakers and professional organisations could leverage the momentum of Vision 2030 to build clearer, comfort-seeking acoustic guidance for commercial offices (as P5 said “if you had more stringent requirements from the authorities, that would definitely drive that.”).

Limitations and Future Research Directions

There are a few caveats to be mentioned. The small purposive sample does not allow for the statistical generalisation of the findings but rather studies these findings for analytical depth and transferability. The sample is skewed in favor of the supply and consultancy side (with one person representing the design profession directly and none representing end clients) and there may be sampling bias due to the direction of recruitment by the researcher's professional network. The data are cross-sectional and capture a market described as changing rapidly. Interviews were conducted in English, which may have limited the expressiveness of some participants, and one participant provided written rather than interview responses. The integrated framework is an interpretive product, based on eight interviews and has not been tested and should be seen as propositions.

Future research may involve end users and design professionals who are not currently part of the supply chain; apply longitudinal designs to monitor the changes in adoption as Vision 2030 projects unfold; use the United Arab Emirates as a reference point as it is a well-established market in the Middle East; and employ quantitative designs to assess the impact of the factors and challenges identified here in a larger, more representative sample. Studies could also test the propositions of the integrated framework, for example whether stronger institutional benchmarks for acoustic performance shift relative advantage away from cost alone, and examine whether the framework holds in other project-based construction sectors.

Theoretical and Contextual Contributions

The study also provides qualitative and context-specific evidence from a market that has not received much research attention and demonstrates the inter-relationships and interaction of factors and challenges within a transitional institutional context (as opposed to them being treated as separate variables). Its theoretical premise is a blend of Innovation Diffusion Theory (IDT) and Institutional Theory, which explains that the institutional environment affects whether the benefit from the innovation can be made visible, that coercive and mimetic institutional pressures drive diffusion more than normative institutional pressures, and that the unit of diffusion in a project-based sector is the specification chain, not the individual adopter. It also identifies the intangibility of acoustic performance as a foundational challenge that amplifies the cost, awareness and late-stage budgeting barriers. For practitioners, it clarifies the sequence in which acoustic decisions are made in the Saudi commercial office sector and where intervention is likely to have most effect.

Conclusion

The aim of this study was to investigate the factors and challenges that influence the implementation of acoustic solutions in the workplace in the commercial office sector in Saudi Arabia. For RQ1, cost was the dominant factor for all participants, followed by design intent and aesthetics, while wellbeing and sustainability were more contested and conditional on client and project type. For RQ2, awareness and knowledge gaps were the most pervasive challenge, alongside cost perception and late-stage budgeting, market maturity and supply chain constraints, and the intangibility of acoustic performance, which amplifies the others. Adoption in this market is therefore shaped primarily by the twin pillars of cost and awareness, within a market in transition that is increasingly propelled by Vision 2030 and international expertise yet still constrained by educational, structural and perceptual barriers. Theoretically, the study shows that diffusion and institutional perspectives are most useful when combined: institutions shape whether the benefits of acoustic solutions can be observed, valued and verified, and diffusion theory explains how individual specifiers respond within those conditions. Addressing these barriers through education, early integration, real-world evidence of benefit, assistance in developing the supply chain, and supportive regulation, gives stakeholders a real opportunity to advance adoption and improve the quality of the workplaces that Saudi Arabia's commercial development is creating.

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