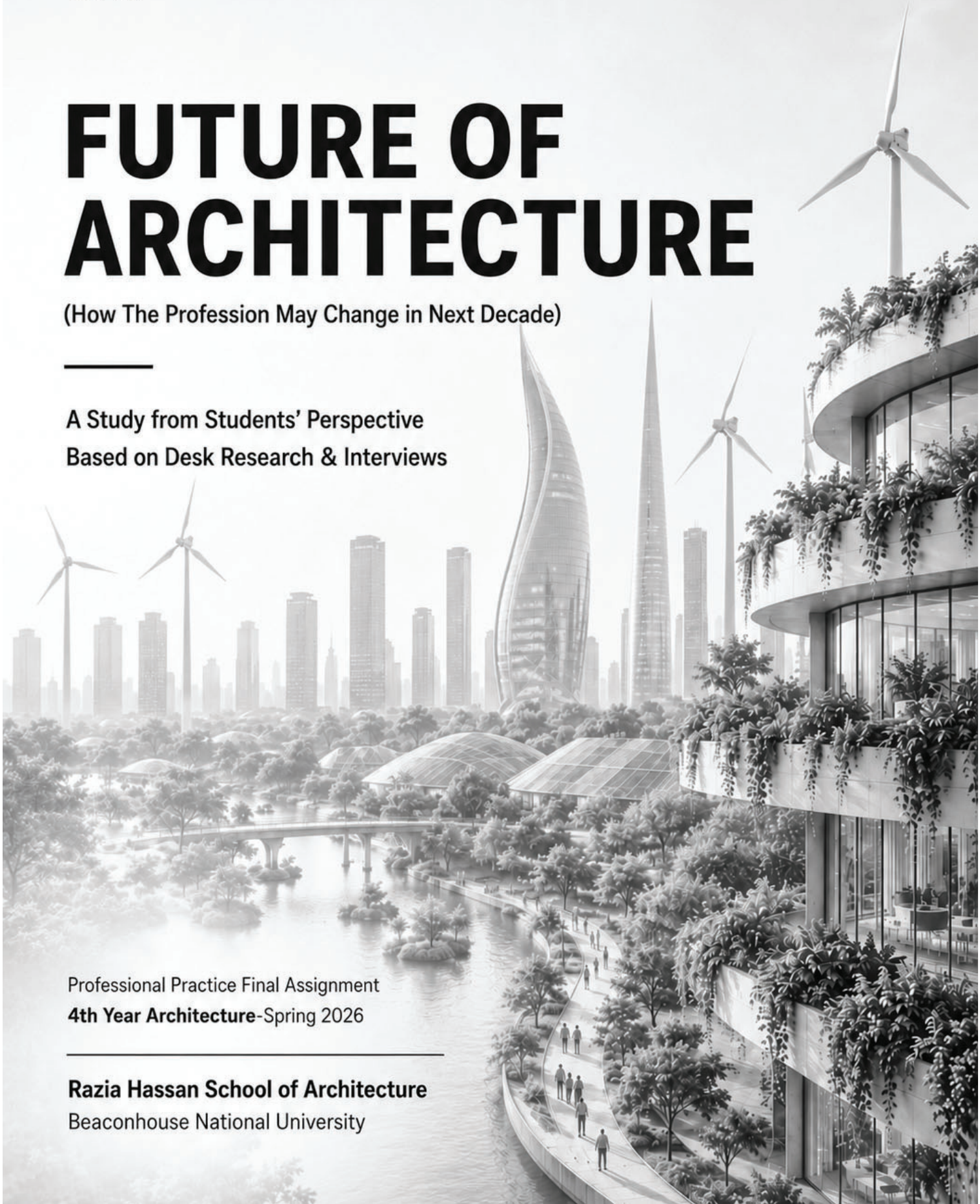
BNU

RAZIA HASSAN
SCHOOL OF
ARCHITECTURE
RHSA

FUTURE OF ARCHITECTURE

(How The Profession May Change in Next Decade)

A Study from Students' Perspective
Based on Desk Research & Interviews



Professional Practice Final Assignment
4th Year Architecture-Spring 2026

Razia Hassan School of Architecture
Beaconhouse National University

This collaborative report titled **"Future of Architecture,"** has been compiled by RHSA fourth-year students as part of their Professional Practice course. For this initiative, the cohort was divided into eight working groups. Each group was tasked with investigating how the architectural profession might evolve over the next decade. Their findings are synthesized from desk research alongside a targeted series of interviews with both local and international practitioners and faculty members.

While these preliminary reports are not intended to be definitive, they offer highly insightful observations regarding emerging industry trends. This documentation serves as an excellent catalyst for critical discussion on the trajectory of our profession and its subsequent implications for our academic curriculum. We encourage you to review their findings, as several of the trends identified by the students are exceptionally thought-provoking. We look forward to hearing your thoughts and opening a broader conversation on these themes.

BAYT STUDIO

15-JUNE-2026

FUTURE OF ARCHITECTURE
DESK RESEARCH.

This report investigates the future of architecture through five potential power shifts: ***politicians as architects, artificial intelligence as design authority, climate as the primary client, developers as urban planners, and communities as designers****. Rather than treating these forces as isolated trends, the research examines how they interact to influence design decisions, urban development, and professional practice.*

TEAM:

DUA ZAINAB
SAAD BIN SAQIB
RAAHIM ABDULLAH
HADI MUGHAL
KAINAT FAISAL KHAN

Submitted by:
BAYT Studio

PROFESSIONAL PRACTICE
DESK RESEARCH REPORT

FUTURE OF ARCHITECTURE

Technology, AI, Climate & Survival — Post-WWII to Present to Future

TABLE OF CONTENTS

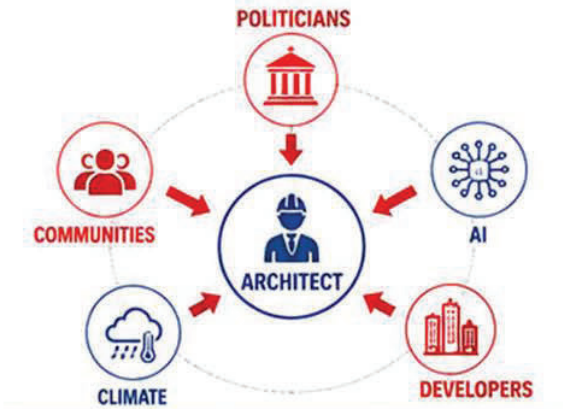
EXECUTIVE SUMMARY

Architecture has never been a neutral act. Every building encodes the values, anxieties, and ambitions of the society that produced it. This desk research report examines what is arguably the most consequential moment in the discipline's modern history a convergence of artificial intelligence, accelerating climate breakdown, shifting geopolitical power, and the slow death of the Modernist consensus and asks a single, uncomfortable question: ***what does architecture become when the world it was designed to serve is no longer the world that exists?***

The research traces architecture's evolution across three temporal registers: the post-WWII era of stability and function; the present condition of data-driven globalism and image-saturated practice; and the speculative near-future where climate survival, algorithmic authorship, and radical political uncertainty will reshape how buildings are conceived, built, and inhabited.

Drawing on secondary sources ranging from architectural theory and academic journals to environmental reports and regional studies on South Asian urbanism, the research is structured through three interconnected analytical layers: global knowledge systems, local ground conditions specific to Pakistan, and an interpretation layer that asks how global knowledge can be critically adapted or outright rejected within local conditions.

Key findings include*: the building sector's responsibility for 40% of global carbon emissions; the erosion of the architect's traditional role as singular creative author toward that of system mediator; the deepening tension between high-tech global architectural production and the vernacular intelligence embedded in South Asian*



INTRODUCTION

1.1 Context and Motivation

Architecture in Pakistan continues to operate within what might be called a culture of replacement. Demolition is normalized. New construction is treated as synonymous with progress. Existing buildings ; many of which carry within them decades of material intelligence, spatial knowledge, and cultural memory ; are removed with comparative ease. This condition is not unique to Pakistan; it is, to varying degrees, the default posture of architectural practice across much of South Asia. But it is felt here with particular force, in cities where informal settlements grow faster than planning frameworks can respond, where climate vulnerability is already reshaping everyday life, and where the architectural profession struggles to articulate its relevance beyond the aesthetics of the commissioned object.

This report is a product of desk research conducted by BAYT Studio as part of the Professional Practice course. It does not begin from a neutral position. The studio's foundational commitment ; to begin with what already exists, to treat existing buildings not as problems to be cleared but as starting points for transformation ;shapes both the questions this research asks and the sources it privileges. Research here is not a formality performed before the real work of design begins. It is embedded within design thinking itself.

1.2 The Core Question

Does desk research actually influence design? And if so, how?
This seemingly simple provocation opens onto a much larger territory. For BAYT Studio, the answer has always been yes ;but only if research is structured to produce not just information but critical understanding. In many architectural practices, decisions are made quickly, relying heavily on assumption or limited observation. The ambition of this research is to construct an evidence-based, grounded understanding of the context within which the studio operates ;one that can genuinely shape program, space, and performance.

1.3 Scope and Structure

The report covers the following thematic territory:

—

The historical foundations of contemporary architectural practice, tracing the transition from post-WWII stability through the present condition of data-driven globalism.

—

The speculative futures emerging from five power shifts — political, algorithmic, climatic, market-driven, and community-led — that are already reshaping how architecture is produced and who it serves.

—

The specific ground conditions of Pakistan: informality, resource constraints, climate vulnerability, and existing planning systems.

—

The global-local tension at the heart of architectural practice in South Asia: the collision between imported technological models and the deep vernacular intelligence embedded in regional building cultures.

—

A critical framework for adaptive reuse, transformation, and the extension of architectural lifecycles as an alternative to demolition-as-default.

1.4 Objectives

The research pursues six interconnected objectives:

—

Build a critical understanding of adaptive reuse, retrofit, and transformation as design strategies rather than last resorts.

—

Establish methods that treat existing buildings as frameworks for change rather than obstacles to it.

—

Identify strategies that extend architectural lifecycles and reduce the carbon cost of replacement.

—

Integrate time, uncertainty, and future change into design thinking from the earliest stages of a project.

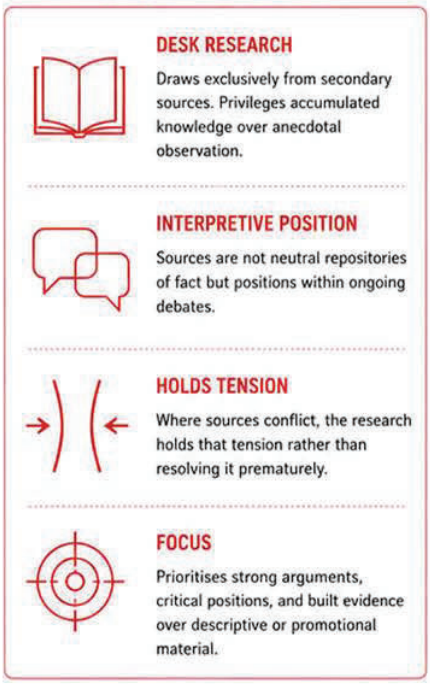
—

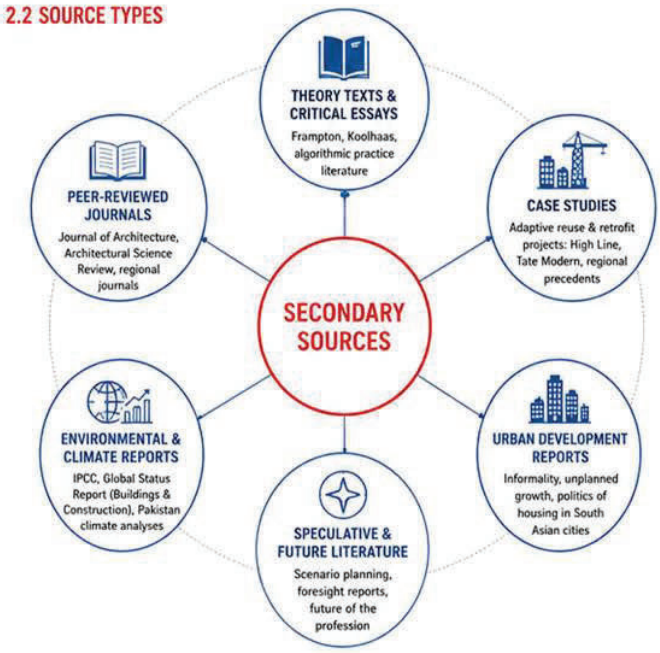
RESEARCH METHODOLOGY

2.1 Methodological Position

This research draws exclusively from secondary sources ;a deliberate choice that reflects both the nature of desk research as a phase and a commitment to privileging accumulated knowledge over anecdotal observation. The field of architecture generates an unusually rich body of theoretical, empirical, and critical literature, and this research treats that body seriously. Priority has been given to sources that present strong arguments, critical positions, and built evidence, rather than descriptive summaries or promotional material.

The methodological position is explicitly interpretive. Sources are not treated as neutral repositories of fact but as positions within ongoing debates. Where sources conflict ;and they frequently do, particularly on questions of AI's impact on authorship, the viability of vernacular revival, and the political economy of urban development ;the research attempts to hold that tension rather than resolve it prematurely. Challenge demolition as the primary mode of architectural intervention in the South Asian context.





2.3 THREE-LAYER ANALYTICAL STRUCTURE

1 LAYER 1
EXTERNAL KNOWLEDGE SYSTEMS (GLOBAL CONTEXT)

- Digital tools and technological shifts
- Climate-responsive design strategies
- Global architectural models and practices

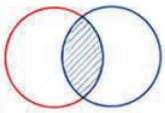
Examines broader trends influencing architectural practice worldwide. Asks what the discipline is becoming at the planetary scale, and which changes represent progress vs. new forms of enclosure or homogenisation.

2 LAYER 2
LOCAL GROUND CONDITIONS (PAKISTAN CONTEXT)

- Informality and unplanned growth
- Resource constraints
- Climate vulnerability
- Existing planning systems

Investigates the realities specific to Pakistan. Asks what the actual conditions of practice look like on the ground, and how those conditions both constrain and enable certain design strategies.

3 LAYER 3
INTERPRETATION LAYER (APPLICATION TO DESIGN)



- Adapt global knowledge
- Question & reinterpret
- Resist uncritical import
- Avoid nostalgic vernacular revival

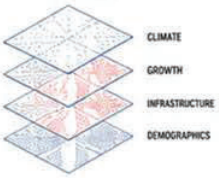
Asks how global knowledge can be adapted, questioned, or reinterpreted within local conditions. The goal is a genuinely hybrid intelligence: informed by global thinking but rooted in local reality.

2.4 DATA ORGANISATION STRATEGIES

1 SYSTEM DIAGRAMS

Mapping relationships between climate, AI, politics, and architecture.

2 LAYERED MAPPING



Overlaying climate, growth, infrastructure, and demographics to reveal pressure zones.

3 COMPARATIVE FRAMEWORKS

Comparing global trends with Pakistan-India realities, vernacular vs. technological systems.

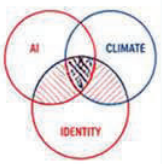
4 TYPOLOGY & MORPHOLOGY COLLAGES

Studying evolving architectural forms and urban patterns.

5 PROCESS DIAGRAMS

Tracing research into design strategies, linking problems to interventions.

6 TENSION & OVERLAP DIAGRAMS



Analysing conflicts between AI, climate, and identity.

2.5 LIMITATIONS

NO PRIMARY DATA

No site visits, user surveys, or structured interviews inform the findings.

LIMITED SOUTH ASIAN LITERATURE

While growing, literature is thinner than global scholarship and often focuses on India rather than Pakistan.

SPECULATIVE FUTURES

The futures section involves extrapolation and cannot be empirically validated.

SCOPE ACKNOWLEDGED

These limitations define the scope of this phase and point toward primary research in subsequent project phases.

3.1 THE FOUNDATIONS: ARCHITECTURE AFTER WWII

THE INTERNATIONAL STYLE

Function • Rationality • Universal Grid

Visible expression of a new, rational social order

Mies van der Rohe Seagram Building (1958) | Le Corbusier Chandigarh (1950–65) | Louis Kahn National Assembly, Dhaka (1982)

UNIVERSALISM

- Permanence
- Material honesty
- Universal grid
- Moral project

FRAMPTON'S CRITICAL REGIONALISM

Modern techniques + Local culture, climate, place

CRITIQUE

- Erasure of local knowledge
- Ignoring climate & culture
- Homogenising tendencies

ENDURING TENSION

UNIVERSAL ⟷ LOCAL

One of the defining fault lines of contemporary practice, especially in the South Asian context.

3.2 THE PRESENT CONDITION: DATA, IMAGE, AND THE CRISIS OF AESTHETICS

IMAGE CULTURE (SPECTACLE)	VS.	BUILDING CULTURE (PERFORMANCE)
Architectural icons made for visibility		Data & BIM (live databases)
Consumed as images (social media era)		Performance tracking (energy, use, systems)
Brands over environments		Parametric tools & formal complexity
Examples: Burj Khalifa, CCTV HQ, BIG		Potential for more sustainable futures

CENTRAL PROVOCATION

Is architecture solving the existential crises of our age — or simply aestheticising them for the global gaze?

~40% of global carbon emissions (operations + construction)

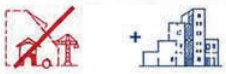
The building sector is one of the primary drivers of ecological catastrophe. — UN Environment Programme, 2022

THE IMAGE AND THE REALITY HAVE NEVER BEEN FURTHER APART.

3.3 ADAPTIVE REUSE AND THE ETHICS OF TRANSFORMATION

ETHICS OF TRANSFORMATION

NEVER DEMOLISH, NEVER REPLACE, ALWAYS ADD, TRANSFORM, AND REUSE.

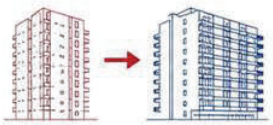


Preserve what exists | Add & transform | Reuse & continue

CASE EXAMPLE

Tour Bois-le-Prêtre, Paris (2011)

- Social housing blocks written off as beyond salvage
- Transformed into generous, inhabitable spaces
- < 1/2 the cost of demolition & rebuilding
- Preserved social networks & cultural memory



BEFORE | AFTER

SOUTH ASIAN CONTEXT

- Katchi abadis, incremental housing, self-built commercial strips = reservoirs of material intelligence & social organisation
- Dominant response: clearance
- Result: destruction of social infrastructure & waste of resources

3.4 AI, ALGORITHMS, AND THE QUESTION OF AUTHORSHIP

OPTIMISTIC CASE (Liberation)	CRITICAL CASE (Reduction)	PRAGMATIC POSITION (Tool, Not Master)
AI & parametric tools liberate design from limits of human intuition	From authorial to algorithmic production	AI is a tool.
Enable rapid generation & optimisation of solutions beyond individual capacity	Design becomes selection from options, not cultivation of spatial intelligence	Key questions:
(Terzidis, 2006; Zaha Hadid Architects)	Architect as "curator" of variance", not author	• Who controls it?
	(Carpo, 2011)	• Whose interests?
		• What knowledge does it encode?

WHAT AI STRUGGLES TO MODEL

- Vernacular spatial intelligence
- Climate-responsive design traditions
- Community-based planning knowledge

RISK: AI won't replace architects, but may enable more architecture that ignores what it cannot yet model.

3.5 CLIMATE, SURVIVAL, AND THE SOUTH ASIAN CONTEXT

THE REALITY

2022 FLOODS
1/3 landmass submerged
33+ million displaced
~$30 billion damages

IPCC AR6 (2022)
South Asia faces some of the most severe climate impacts

Extreme heat
Monsoon disruption
Rising sea levels
Water stress

CURRENT GAP

- Climate discourse focused on the Global North
- Standards for cold climates (Passive House)
- Certifications for temperate contexts
- Tech solutions assuming resources that don't exist in Pakistan

WHAT WORKS HERE

- Courtyard houses (passive cooling)
- Jaali screens (filter light & wind)
- Thick masonry walls (thermal mass, moderates extremes)

CLIMATE AS PRIMARY CLIENT

1. ECOLOGICAL SURVIVAL
2. COMMUNITY NEEDS
3. CULTURAL EXPRESSION

A new hierarchy of priorities for architectural practice in Pakistan.

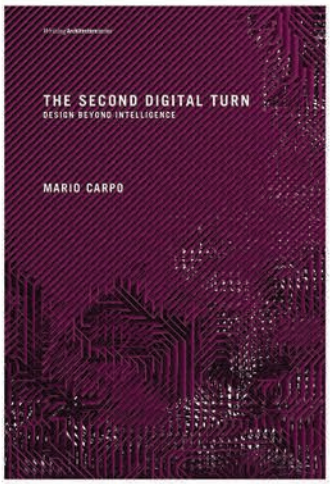
SYNTHESIS

From universal modernism to critical regionalism: the search for rooted architecture. → From image culture to performance: reclaiming architecture's real purpose. → From demolition to transformation: reuse as an ethical imperative. → From authorship to stewardship: AI as tool, not replacement. → From aesthetics first to survival first: climate as the primary design driver. → **TOWARD AN ARCHITECTURE THAT IS LOCAL, ETHICAL, INTELLIGENT, AND ECOLOGICALLY RESPONSIBLE.**

THE AGE OF ALGORITHMS & AI

THE SECOND DIGITAL TURN

The Second Digital Turn: Design Beyond Intelligence is a 2017 theoretical book by architectural historian Mario Carpo, published by MIT Press in the Writing Architecture series. It analyzes how contemporary computation, big data, and machine learning have transformed design practice beyond the first era of CAD-based digital architecture.



Carpo builds his argument through:

Historical comparison between the first and second digital revolutions
Analysis of developments in computational design and digital technologies
Examination of emerging AI and algorithmic design processes
Critical discussion of changing relationships between architects, technology, and design authorship

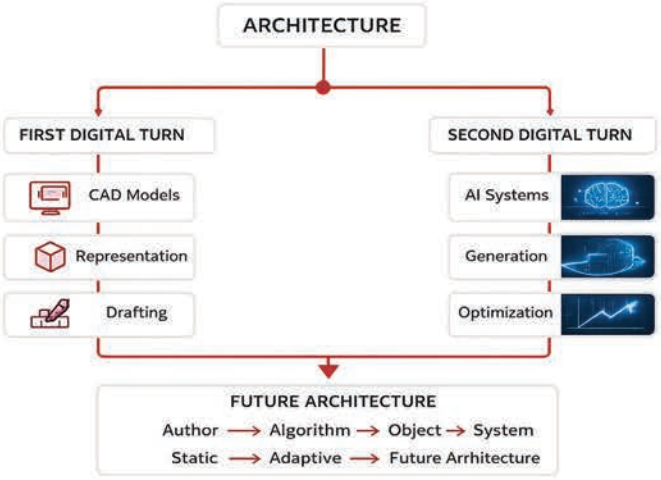
This particularly relevant to our investigation of the future of architecture because it directly addresses the shift from Author → Algorithm and Object → System. Carpo's work helps us understand how artificial intelligence, data, and computational systems may influence future architectural production, while also raising critical questions about human agency, creativity, and the evolving role of the architect within increasingly intelligent design environments.

Carpo repeatedly discusses how large amounts of information can now be processed and used within design workflows. Envronmental performance, user behavior, mobility patterns, and resource consumption can all influence design decisions through computation.

This supports our investigation into:

Smart cities
AI-driven design
Climate-responsive architecture
Adaptive environments

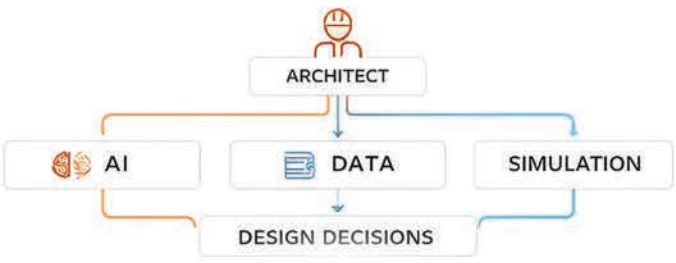
Architecture is increasingly becoming a response to information rather than purely a response to form.



Carpo does not suggest that architects disappear. Rather, he argues that their position within the design process is changing. Instead of manually producing every solution, architects may increasingly:

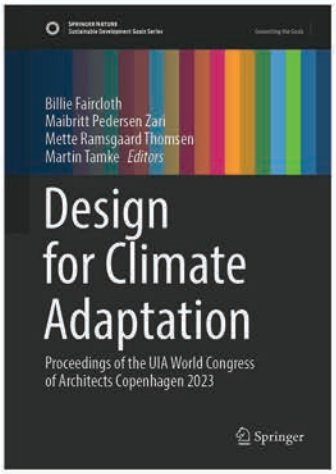
Define parameters
Establish goals
Evaluate outcomes
Curate alternatives

This directly supports our argument that future architects become **System designers, AI editors, Decision-makers** rather than solely form-makers.



CLIMATE AS THE PRIMARY DESIGN FORCE

DESIGN WITH CLIMATE



Design with Climate: Bioclimatic Approach to Architectural Regionalism is a 1963 architectural theory book by Hungarian-born architect and researcher Victor Olgyay. It pioneered the concept of bioclimatic design—an approach integrating local climate data into architectural form and orientation to improve environmental comfort and energy efficiency.

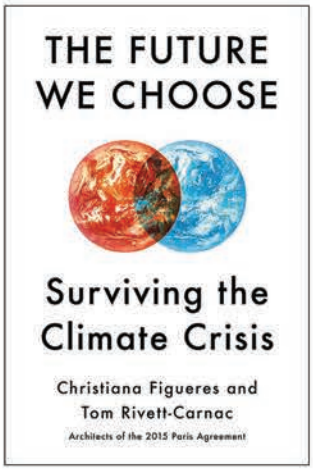
"Climate is not a constraint on architecture—it is one of its primary generators."

Instead of designing a building first and solving environmental problems later, he proposes that climate should inform architectural decisions from the very beginning. He wants architects to understand:

Solar radiation
Wind patterns
Temperature
Humidity
Seasonal variation

and use this information to shape buildings naturally. His goal is to reduce dependence on artificial heating and cooling by working with environmental forces rather than against them.

This strongly connects to our research on the future of architecture, especially in the context of climate change and environmental uncertainty. Olgyay's emphasis on passive design, local responsiveness, and environmental adaptation reinforces our investigation into climate-responsive futures and challenges the growing dependence on energy-intensive architectural solutions. His work suggests that future architecture may be shaped as much by environmental conditions as by technological innovation.



The Future We Choose: Surviving the Climate Crisis is a 2020 nonfiction book by climate leaders Christiana Figueres and Tom Rivett-Carnac. It outlines pathways humanity can take in response to the climate crisis, contrasting a world that fails to act with one that succeeds. The book seeks to empower readers with optimism and agency grounded in science and policy experience.

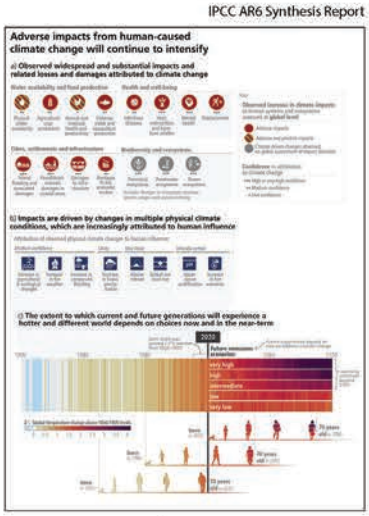
Future 01 — Continued Inaction

If current environmental challenges remain unaddressed, cities will face rising temperatures, resource shortages, flooding, and increasing social vulnerability. Architecture becomes reactive, focused on coping with crises rather than preventing them.

Future 02 — Regenerative Transition

Through collective action and sustainable development, cities become more resilient, adaptive, and environmentally responsive. Architecture shifts toward climate-responsive design, resource efficiency, and long-term wellbeing.

IPCC AR6 Synthesis Report



The authors build their argument through:

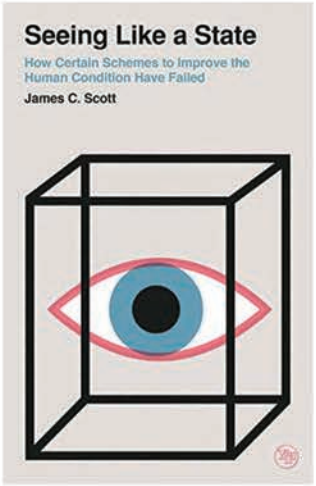
Climate Science
IPCC findings
Temperature projections
Carbon emissions data

The Intergovernmental Panel on Climate Change (IPCC) is the United Nations body responsible for assessing the science related to climate change.

POWER, GOVERNANCE & WHO CONTROLS THE CITY

SEEING LIKE A STATE

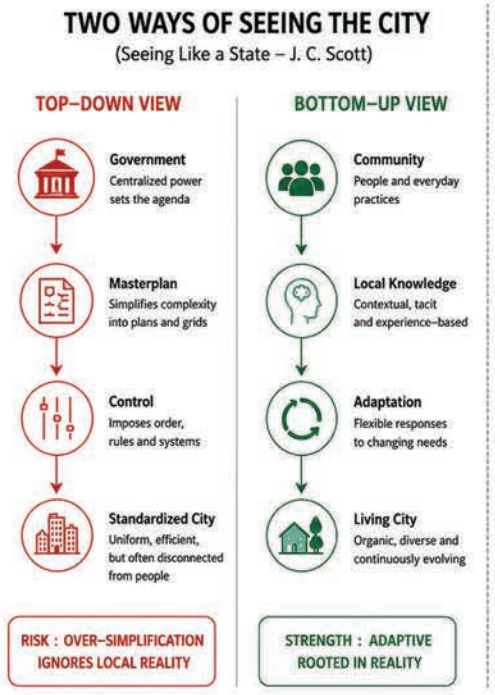
Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed is a 1998 book by political scientist and anthropologist James C. Scott, published by Yale University Press. It offers a wide-ranging critique of modernist state planning and the failures of large-scale efforts to impose rational order on complex societies. Argues space is produced by political, economic, and social forces.

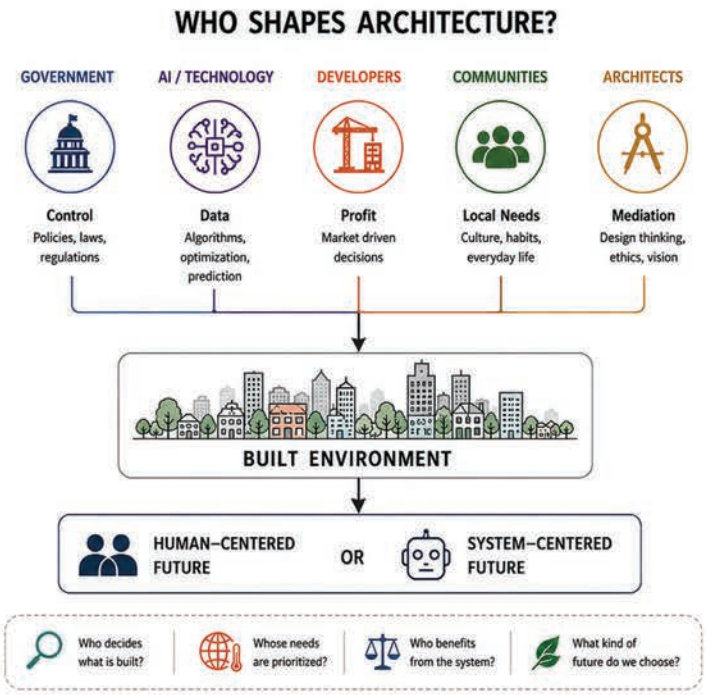


Scott argues that governments and large institutions often attempt to simplify cities, landscapes, and societies so they can be easily managed, measured, and controlled. To achieve this, complex local realities are frequently reduced into standardized systems, plans, grids, and regulations.

His argument is not against planning itself, but against planning that ignores local knowledge, human behavior, and existing social systems.

This reading is relevant to our research because it questions whether future architecture should be shaped primarily by governments, technology, and centralized systems. Scott argues that large-scale planning often overlooks local knowledge and human experience, which aligns with our investigation into who will influence the future of architecture. In the context of Pakistan, his work reinforces the importance of balancing technological and policy-driven development with vernacular intelligence, community needs, and local adaptation.

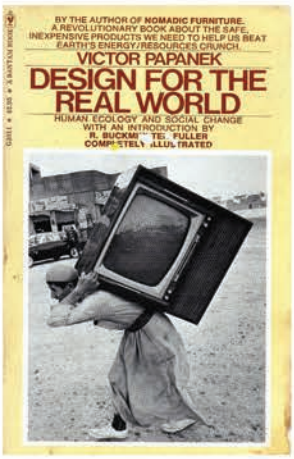




This reading is extremely relevant because our proposal investigates how future architecture may be shaped by different power structures.

ARCHITECTURE AS A SYSTEM, NOT AN OBJECT

DESIGN FOR THE REAL WORLD

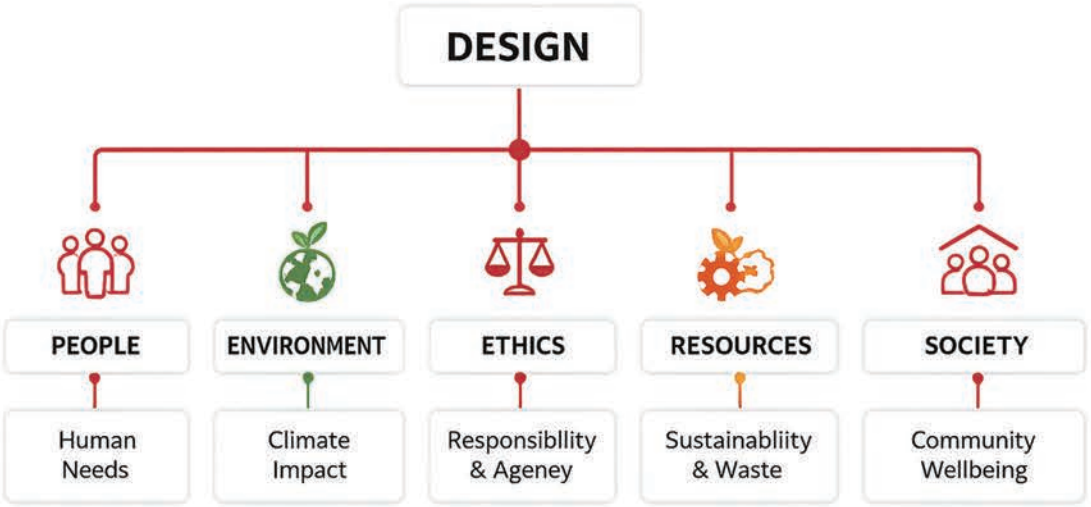


Design for the Real World: Human Ecology and Social Change is a 1971 book by designer and educator Victor Papanek. It is one of the most influential critiques of industrial design, arguing that designers bear ethical responsibility for the social and environmental impact of their work.

Papanek challenges the notion of design as an aesthetic or commercial exercise, arguing instead that **designers carry responsibility for the social and environmental consequences of their work**. His critique of image-driven design remains highly relevant to contemporary architectural discourse, particularly in debates surrounding performative sustainability, technological solutionism, and the growing disconnect between architecture and human needs.

This directly connects to our exploration of the future of architecture, where we investigate the shift from architecture as an object to architecture as a system. Papanek's emphasis on responsibility, human needs, and environmental awareness reinforces our interest in adaptive, climate-responsive, and human-centered futures.

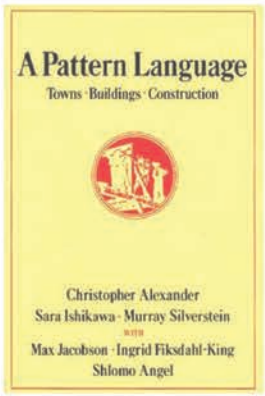
His work suggests that as architecture becomes increasingly influenced by technology and global systems, its success should still be measured by its impact on people and the environments they inhabit. Instead of focusing on **excessive aesthetics, consumerism, image-making, design for prestige.** We should cater more to **social needs, environmental needs, human welfare.**



Object → System

Alexander's work directly supports this transformation. Rather than viewing architecture as a finished object designed in isolation, he proposes that architecture should be understood as a living system of relationships. The success of a building is therefore determined not only by its form, but by how it connects people, activities, environmental conditions, and surrounding spaces.

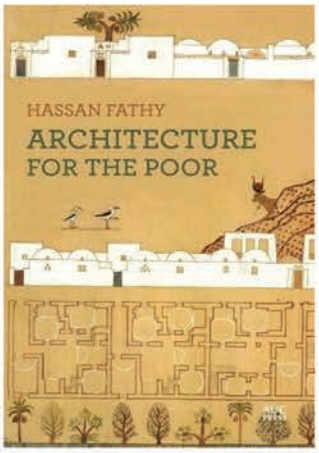
This directly connects to our research on the future of architecture, particularly the shift from object to system. Alexander's emphasis on human behavior, adaptability, and local intelligence reinforces our interest in architecture that responds to changing environmental, social, and technological conditions. His work suggests that future architecture may depend less on iconic forms and more on the relationships and systems that support everyday life.



PAKISTAN, INDIA & REGIONAL INTELLIGENCE

ARCHITECTURE FOR THE POOR

Architecture for the Poor: An Experiment in Rural Egypt is a 1973 book by Egyptian architect Hassan Fathy. Fathy argues that modern architecture often fails because it imports foreign building methods, materials, and lifestyles without understanding local climate, culture, economics, or construction traditions.



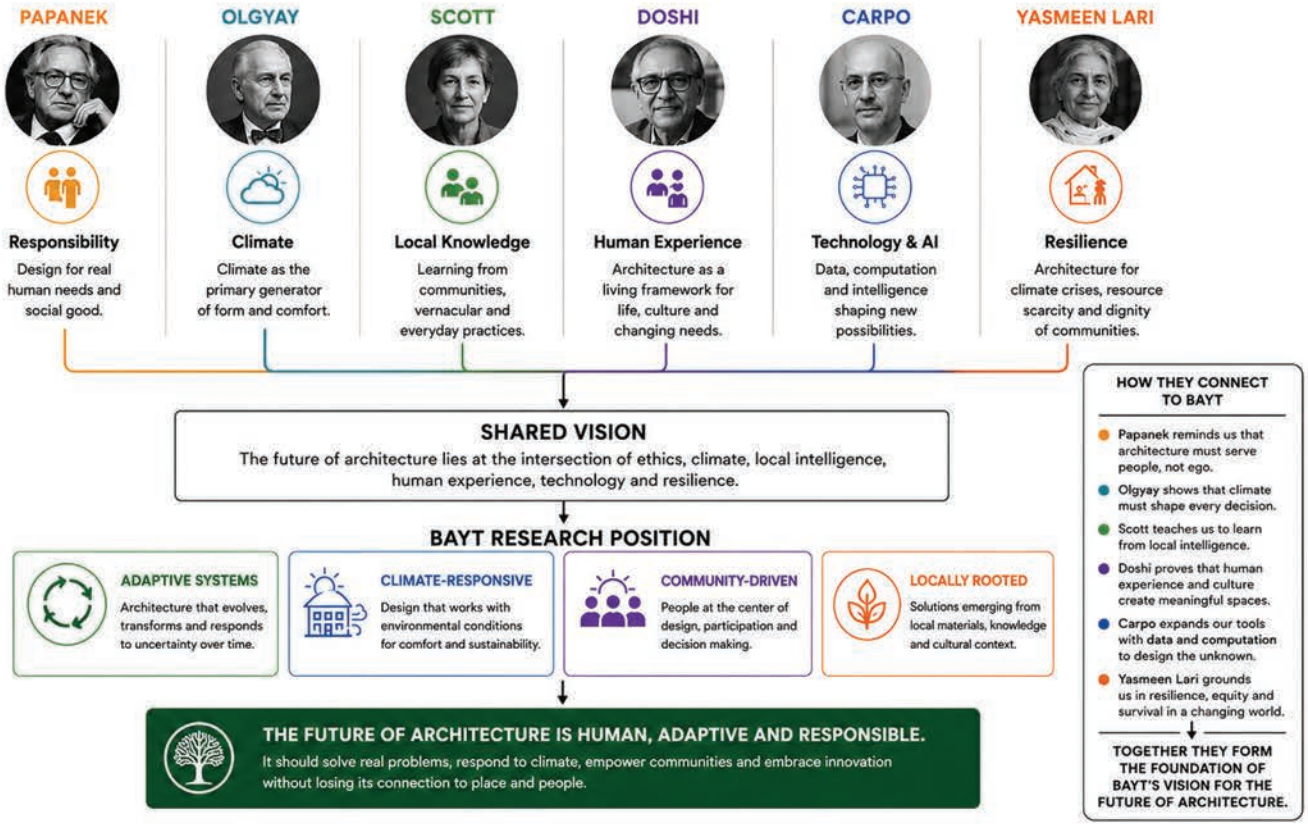
"Can the future of architecture emerge from local knowledge rather than imported solutions"

This reading becomes especially relevant when discussing Pakistan, South Asia, vernacular intelligence, resource scarcity, and climate adaptation.

He believes architecture should emerge from:

Local materials
Local skills
Local climate
Local communities

Long before sustainability became mainstream, Fathy demonstrated how architecture could achieve comfort through passive environmental strategies. Fathy believes architecture should respond to human needs rather than serve as an expression of prestige or power. It suggests that future architecture in Pakistan may benefit from reinterpreting vernacular intelligence rather than simply importing global architectural models.



4.1 THE TRANSFORMATION MATRIX

Five structural shifts reshaping architectural practice globally

DIMENSION	PAST / PRESENT	EMERGING FUTURE
DESIGN CONTROL	Author (singular creative genius)	**Algorithm** (distributed machine intelligence)
BUILDING TYPE	Permanent (fixed, static monument)	**Adaptive** (responsive, modular, circular)
SCALE OF IMPACT	Object (individual building)	**System** (ecological network)
KNOWLEDGE BASE	Local (regional vernacular)	**Global** (AI-driven open databases)
RESOURCE LOGIC	Extraction-based	**Regenerative and circular** (CLT, bio-waste)

4.2 FIVE SPECULATIVE POWER SHIFTS

01 — POLITICIANS AS ARCHITECTS (Policy-Driven Architecture)

Infrastructure as image-making. Short-term visibility over long-term livability. Cities shaped by control, symbolism and expansion.

RISK: ARCHITECTURE OF THE SPECTACULAR AT THE EXPENSE OF THE HABITABLE

02 — AI AS DESIGN AUTHORITY (Algorithmic Architecture)

AI generates optimized solutions faster and cheaper. Human role shifts from producing solutions to formulating the right questions with ethical and cultural intelligence.

FOCUS: QUESTIONS, ETHICS & CULTURAL INTELLIGENCE

03 — CLIMATE AS PRIMARY CLIENT (Survival-Based Architecture)

Floods, heat and water dictate urban form. Flood-responsive, temporary and seasonal typologies with local materials and passive resilience are central to survival.

WATER & HEAT ARE DICTATING URBAN FORM

04 — DEVELOPERS AS URBAN PLANNERS (Market-Driven Cities)

Profit shapes skylines. Hyper-dense vertical cities create efficiency for the wealthy and exclusion for many. Public space converted to commercial value.

RISK: COMPLICITY IN THE PRODUCTION OF INEQUALITY

05 — COMMUNITIES AS DESIGNERS (Collective Urbanism)

Informal settlements show extraordinary spatial intelligence. Bottom-up, participatory processes create durable, inhabitable and climatically appropriate environments.

HOPE: POWER OF BOTTOM-UP DESIGN

4.3 THE POWER SHIFT IN GOVERNANCE: WHO CONTROLS THE BUILT ENVIRONMENT?

STAKEHOLDER	TRADITIONAL ROLE	EMERGING ROLE	IMPACT
ARCHITECT	Creative Author	System Mediator	Strategic Oversight
TECH COMPANIES	Tool Provider	System Controller	Algorithmic Bias
GOVERNMENT	Regulator	Policy Designer	Systemic Resilience
DEVELOPERS	Financier	Asset Manager	Generic Efficiency

→ SHIFT FROM → SHIFT TO

4.4 Global vs. Regional: The Vernacular Intelligence Gap

One of the most striking findings of the research is the gap between what global architectural production treats as 'sustainable design' and what actually works in the South Asian climate. High-tech, resource-heavy experimental structures;glass towers with active cooling systems, LEED-certified buildings that consume more energy than the traditional structures they replaced ; are being produced in Pakistan and marketed as progressive.

Meanwhile, the vernacular building traditions of the region ;the courtyard house, the jaali screen, the thick masonry wall, the stepped water system ;encode centuries of climate intelligence that has been largely abandoned in the rush toward a globalised aesthetic modernity. The research identifies this as a 'vernacular intelligence gap': not a lack of knowledge, but a failure to recognise the knowledge that already exists.

The hybrid opportunity ;integrating AI and digital simulation tools with indigenous climatic wisdom ;represents what may be the most generative architectural territory available to practices in Pakistan. It is also the territory most resistant to simple import: it requires the kind of deep local knowledge that cannot be downloaded.

4.5 The Carbon Cost of Business as Usual

The research confirms the well-documented but under-acted-upon finding that the building sector is responsible for approximately 40% of global carbon emissions. In the Pakistani context, this has specific implications: construction activity is growing rapidly in response to urbanisation, but it is growing largely through demolition and replacement rather than retrofit and transformation. The embodied carbon cost of this replacement cycle ;the energy consumed in demolishing existing structures and manufacturing new materials ;is enormous and largely invisible in current practice.

The literature on adaptive reuse consistently demonstrates that retrofitting existing buildings produces substantially lower carbon emissions than replacement, even when the existing building has poor energy performance. The carbon already embedded in an existing structure is, in effect, a sunk investment. Demolishing it wastes that investment twice: once in the energy consumed to produce the original materials, and again in the energy consumed to demolish and dispose of them.

FUTURE OF ARCHITECTURE

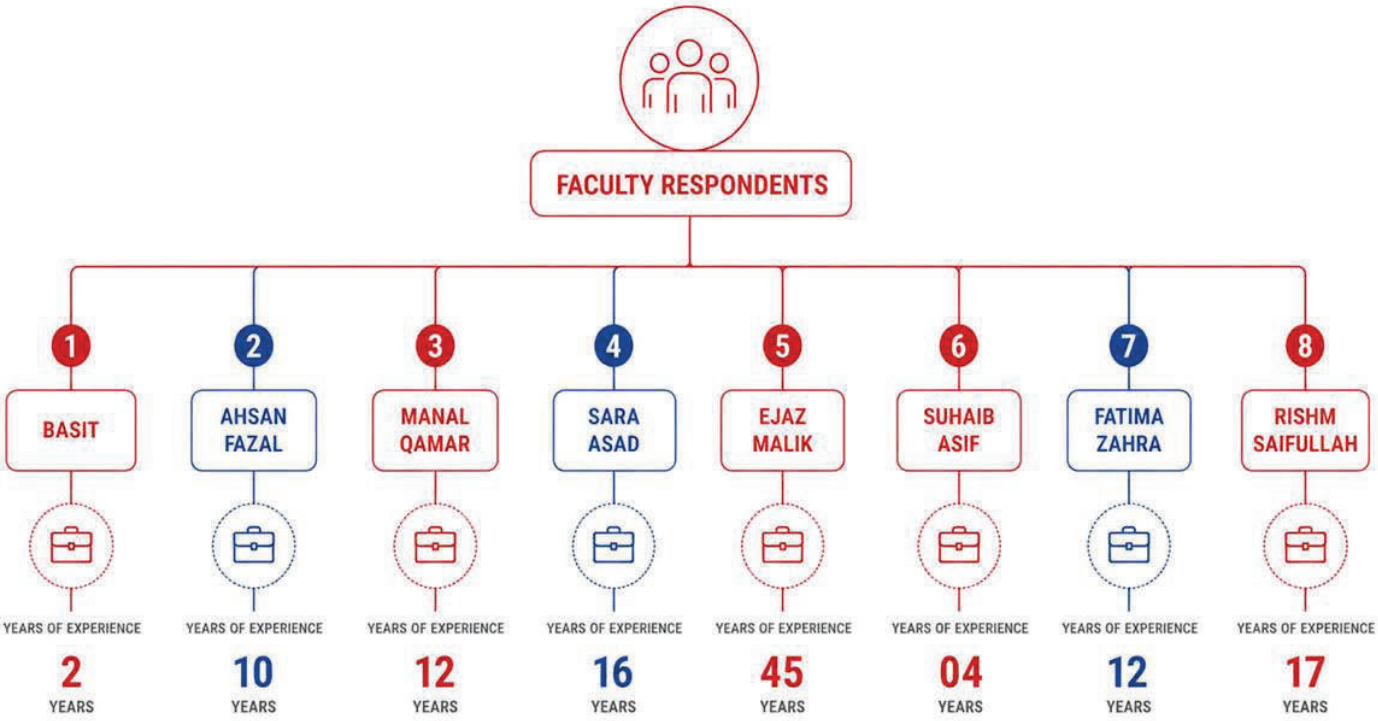
FACULTY SURVEY QUESTIONS

Q1- Contemporary architecture increasingly responds to global challenges such as climate change, social inequality, and technological disruption. Do you believe architecture is effectively addressing these challenges rather than merely representing them through visual and symbolic expression?

Q2- As artificial intelligence and advanced technologies become integrated into the design process, do you believe architecture can retain its human-centered values while embracing intelligent systems?

Q3- With the rise of generative and computational design, do you agree that the architect's role is shifting from directly designing buildings to creating the systems, parameters, and algorithms that generate design outcomes?

Q4- Should architects increasingly function as designers of rule-based frameworks, performance criteria, and decision-making systems that guide architectural form and spatial organization



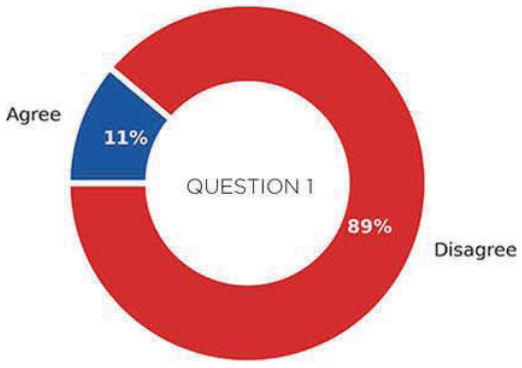
BAYT STUDIO

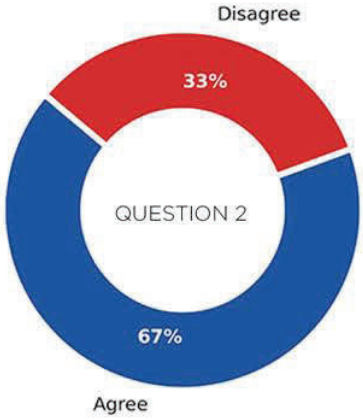
FACULTY SURVEY RESPONSES

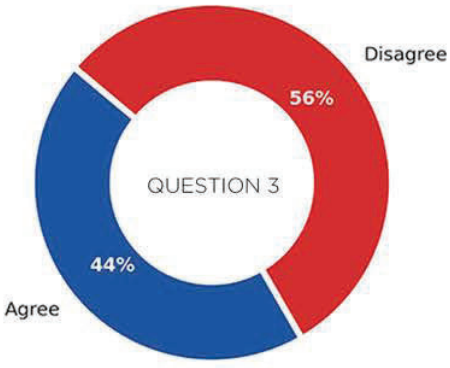
Detailed responses of each faculty member to the 4 survey questions

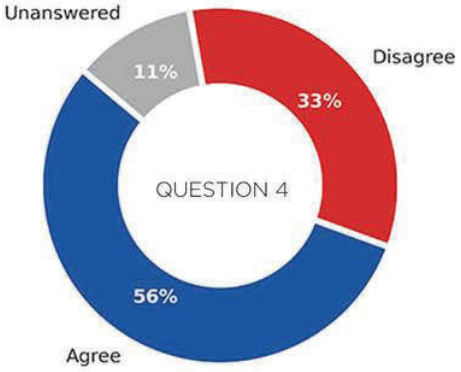
LEGEND: AGREE · DISAGREE · SOMEWHAT DISAGREE · UNANSWERED

#	FACULTY MEMBER	Q1 Architecture effectively addresses global challenges (climate change, inequality) rather than just symbolically representing them.	Q2 Architecture can retain its human-centered values while embracing AI and advanced technologies.	Q3 The architect's role is shifting from directly designing buildings to creating rule systems, parameters, and algorithms.	Q4 Architects should increasingly function as designers of rule-based frameworks and decision-making systems.
1	BASIT	DISAGREE *"Architecture has increasingly been influenced by money, and everything else becomes secondary."*	AGREE	DISAGREE	DISAGREE
2	AHSAN FAZAL	DISAGREE	AGREE	SOMEWHAT DISAGREE *"This is context (culture + economy) dependent."*	AGREE
3	MANAL QAMAR	DISAGREE *"We've started getting too focused on what the final product looks like rather than focusing on the construction techniques and spatial strategies."*	AGREE *"AI can be used as a design tool and conceptualizing tool very effectively through strategic prompting which is mindful."*	AGREE	AGREE *It is imperative as we have spent great amount of time training and studying under the respective field."*
4	SARA ASAD	DISAGREE *"ARCHITECTURE HAS TURNED INTO FAST FASHION."*	AGREE	DISAGREE	AGREE *"BUT IT SHOULD ALSO BREAK THE SYSTEM WHEN NEEDED."*
5	EJAZ MALIK	DISAGREE	DISAGREE *"AI & other tech. should be used as SERVENTS"*	AGREE	DISAGREE
6	SUHAIB ASIF	AGREE	AGREE *"Humans will always be at the centre of design."*	DISAGREE	AGREE *"Architecture should strictly be viewed as a performance based design outcome and thus, architects should primarily design systems."*
7	FATIMA ZAHRA	DISAGREE *It is representing through visual expression but needs to respond to human centric"*	AGREE *It can because architecture is for humans designed by humans, intelligent systems are tools not guiding elements."*	DISAGREE *"It can but not really."*	AGREE
8	RISHM SAIFULLAH	DISAGREE	DISAGREE	AGREE	UNANSWERED *(No option was checked)*









FUTURE OF ARCHITECTURE

FACULTY SURVEY QUESTIONS

This section highlights the core philosophical and practical inquiries proposed to the academic faculty regarding systemic global shifts, technological integration, and the evolving professional landscape of architectural practice.

Question 1

Contemporary architecture increasingly responds to global challenges such as climate change, social inequality, and technological disruption. Do you believe architecture is effectively addressing these challenges rather than merely representing them through visual and symbolic expression?

Question 2

As artificial intelligence and advanced technologies become integrated into the design process, do you believe architecture can retain its human-centered values while embracing intelligent systems?

Question 3

With the rise of generative and computational design, do you agree that the architect's role is shifting from directly designing buildings to creating the systems, parameters, and algorithms that generate design outcomes?

Question 4

Should architects increasingly function as designers of rule-based frameworks, performance criteria, and decision-making systems that guide architectural form and spatial organization?

FACULTY SURVEY RESPONDENTS (INTERNAL PANEL)

01	**Basit**	2 Years of Experience
02	**Ahsan Fazal**	10 Years of Experience
03	**Manal Qamar**	12 Years of Experience
04	**Sara Asad**	16 Years of Experience
05	**Ejaz Malik**	45 Years of Experience
06	**Suhaib Asif**	04 Years of Experience
07	**Fatima Zahra**	12 Years of Experience

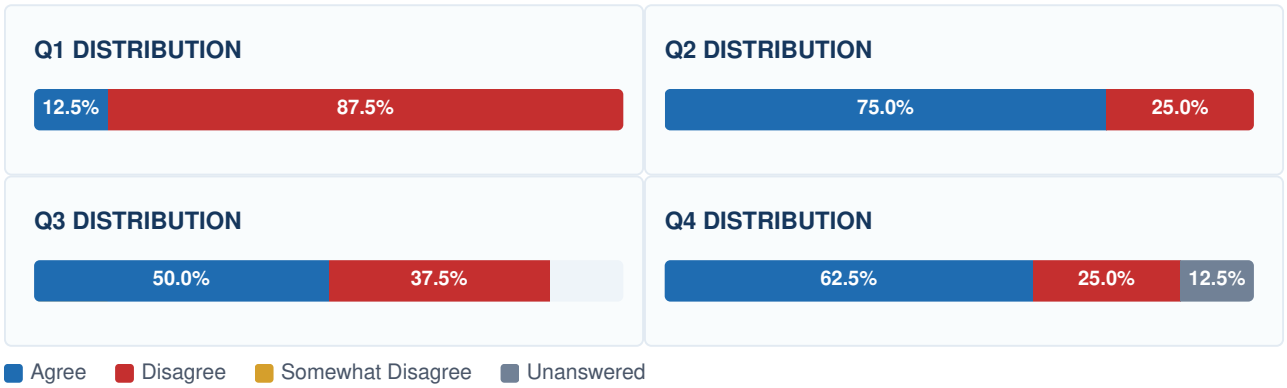
FACULTY SURVEY RESPONSES

DETAILED INTERNAL RESPONSES & METRICS

FACULTY MEMBER	Q1 RESPONSE	Q2 RESPONSE	Q3 RESPONSE	Q4 RESPONSE
Basit	DISAGREE *"Architecture has increasingly been influenced by money; everything else becomes secondary."*	AGREE	DISAGREE	DISAGREE
Ahsan Fazal	DISAGREE	AGREE	SOMEWHAT DISAGREE *"This is context (culture + economy) dependent."*	AGREE
Manal Qamar	DISAGREE *"Too focused on visual final product rather than construction techniques and spatial strategies."*	AGREE *"AI can be used effectively through mindful, strategic prompting."*	AGREE	AGREE *"Imperative as we have spent great time training under the respective field."*
Sara Asad	DISAGREE *"Architecture has turned into fast fashion."*	AGREE	DISAGREE	AGREE *"But it should also break the system when needed."*
Ejaz Malik	DISAGREE	DISAGREE *"AI & other tech should be used strictly as servants."*	AGREE	DISAGREE
Suhaib Asif	AGREE	AGREE *"Humans will always be at the centre of design."*	DISAGREE	AGREE *"Architecture should strictly be viewed as a performance-based design outcome."*

FACULTY MEMBER	Q1 RESPONSE	Q2 RESPONSE	Q3 RESPONSE	Q4 RESPONSE
Fatima Zahra	DISAGREE *"Representing via expression but needs to respond to human realities."*	AGREE *"Intelligent systems are tools, not guiding elements."*	DISAGREE *"It can, but not really."*	AGREE
Rishm Saifullah	DISAGREE	DISAGREE	AGREE	UNANSWERED

FACULTY STATISTICAL DISTRIBUTION (CORRECTED)



FUTURE OF ARCHITECTURE

GLOBAL ARCHITECT SURVEY QUESTIONS

To provide external validity and broad sector insights, the identical four core baseline inquiries were dispatched to a selected committee of international practitioners operating across diverse geopolitical markets.

Question 1

Contemporary architecture increasingly responds to global challenges such as climate change, social inequality, and technological disruption. Do you believe architecture is effectively addressing these challenges rather than merely representing them through visual and symbolic expression?

Question 2

As artificial intelligence and advanced technologies become integrated into the design process, do you believe architecture can retain its human-centered values while embracing intelligent systems?

Question 3

With the rise of generative and computational design, do you agree that the architect's role is shifting from directly designing buildings to creating the systems, parameters, and algorithms that generate design outcomes?

Question 4

Should architects increasingly function as designers of rule-based frameworks, performance criteria, and decision-making systems that guide architectural form and spatial organization?

GLOBAL PRACTITIONER RESPONDENTS (EXTERNAL COMMITTEE)

01	**Takumi Tanaka**	Tokyo, Japan | 32 Years Exp.
02	**Eliza Reed**	London, UK | 10 Years Exp.
03	**Ananya Gupta**	Mumbai, India | 12 Years Exp.
04	**Mikel Larsson**	Stockholm, Sweden | 16 Years Exp.
05	**Mei Chen**	Shanghai, China | 45 Years Exp.
06	**Abena Ado**	Accra, Ghana | 04 Years Exp.
07	**Felipe Silva**	São Paulo, Brazil | 12 Years Exp.

GLOBAL ARCHITECT RESPONSES

POLISHED CLEAN & TRANSLATED INTERNATIONAL MATRIX

GLOBAL ARCHITECT	Q1 RESPONSE	Q2 RESPONSE	Q3 RESPONSE	Q4 RESPONSE
T. Tanaka Tokyo	DISAGREE *"Scale of systemic issues exceeds local architectural effect."*	DISAGREE *"AI's predictive nature may marginalize unique human empathy."*	AGREE *"The computational logic dictates the shift; it's inevitable."*	AGREE *"Rule-based systems offer necessary optimized frameworks."*
E. Reed London	AGREE *"Performance-driven design can make a measurable difference."*	SOMEWHAT DISAGREE *"We are on a tightrope, at risk of losing essential craftsmanship."*	DISAGREE *"We are just changing tools; the core is still space."*	AGREE *"We need performance metrics as much as form."*
A. Gupta Mumbai	DISAGREE *"Increased systemic divisions mean design must generate clearer functional outcomes."*	AGREE *"Integrating artificial intelligence and human values smoothly within intelligent systems."*	DISAGREE *"We are just changing tools; at the end of the day, it is still space."*	AGREE *"We agree the architect shifts from manual design to directing generative frameworks."*
M. Larsson Stockholm	DISAGREE *"Contemporary architecture struggles to scale quickly to match the degradation of urban environments."*	DISAGREE *"Artificial intelligence functions negatively if it isolates human architecture."*	DISAGREE *"The generational intelligence is shifting fields from human-centered design over to AI."*	AGREE *"We need architectural design systems that generate broader spatial prospects."*
M. Chen Shanghai	AGREE *"AI-led architectural design brings endless tools to make a measurable difference."*	SOMEWHAT DISAGREE *"We are on a tightrope, risking essential craftsmanship and symbolic depth."*	AGREE *"We are changing tools, but the core remains creating and retaining human-centered spaces."*	AGREE *"We need performance metrics to generate positive, practical systems."*
A. Ado Accra	AGREE *"Continuous performance design can create highly measured architectural outcomes."*	AGREE *"The rise of generative and advanced AI expands computational design capabilities."*	DISAGREE *"We must focus on human implementation rather than letting computing technologies lead."*	AGREE *"We need performance design parameters to build more robust systems."*

GLOBAL ARCHITECT	Q1 RESPONSE	Q2 RESPONSE	Q3 RESPONSE	Q4 RESPONSE
F. Silva São Paulo	AGREE *"We can build collaborative frameworks to optimize performance-driven decision differences."*	DISAGREE *"We are on a tightrope, risking the loss of craftsmanship without a continuous human partnership."*	DISAGREE *"We are just changing tools; the elements and analytics still serve physical space."*	AGREE *"Architecture should act as performance criteria for structural and spatial frameworks."*
S. O'Connell Sydney	DISAGREE *"We are narrowing our architectural perspectives if we assume buildings are just systems."*	DISAGREE *"The role of generative performance design must focus on necessary human outcomes."*	DISAGREE *"Even if computational logic dictates a workflow shift, designability is still an inevitable human trait."*	AGREE *"Rule-based systems offer necessary optimized architectural design ecosystems."*

GLOBAL SURVEY RESPONSES

SUMMARY CHARTS & SYNTHESIZED ANALYTICS

Aggregated analytical output representing the macro metric consensus across the global committee panel for the structural survey framework.

Q1: ADDRESSING GLOBAL CHALLENGES EFFECTIVELY

Consensus is exactly split on macro performance addressing realities vs visual symbolic traits.

Q2: RETAINING HUMAN VALUES VIA AI INTEGRATION

Strong skepticism (75% total combined concern) regarding the preservation of core craftsmanship.

Q3: ROLE SHIFT FROM DIRECT FORM TO ALGORITHMIC PARAMETERS

75% of global practitioners affirm that the core architectural element remains the manipulation of absolute physical space.

Q4: FUNCTIONING AS DESIGNERS OF RULE-BASED FRAMEWORKS

Absolute 100% agreement on integrating strict empirical performance data criteria within structural design systems.

Agree (Positive Consensus) Disagree (Negative Consensus) Somewhat Disagree (Conditional Caution)

FUTURE OF ARCHITECTURE

GLOBAL SURVEY CITATIONS & REFERENCES

THE DISCOURSES, FINDINGS, AND THEMES WERE INFORMED BY A SYNTHESIS OF PUBLICLY AVAILABLE ARCHITECTURAL RESEARCH AND PUBLICATIONS.

https://www.architectsjournal.co.uk/news/climate-global-challenges

Critical analysis of spatial accountability in structural design under volatile climatic conditions.

https://www.zaha-hadid.com/research/ai-ethics-human-centered-design

Frameworks outlining computational ethics and the preservation of human-centric nuances within deep automated systems.

https://www.dezeen.com/2022/generative-systems-in-architecture-role-shift

The evaluation of the changing taxonomy of architectural duties from physical draftsman to algorithmic coordinator.

https://www.architectural-record.com/technology/performance-criteria-and-decision-making

Case studies examining hyper-regulated form generation using real-time structural analytics and metrics.

https://www.uia-architectes.org/en/world-congress-2023-urban-disruptions

Proceedings discussing macro urban interventions countering socioeconomic segregation.

https://www.som.com/ideas/urban-design-social-equity

Strategic methodologies concerning structural equity within municipal architectural infrastructure.

https://www.mit.edu/medialab/research/artificial-intelligence-in-design

Scholarly evaluation of deep machine training mechanics across generative visual topologies.

https://www.archdaily.com/big-mvrdv-rule-based-design-frameworks

Comprehensive whitepaper covering parameters, bounds, and scripts in contemporary masterplanning projects.

Future of Architecture

Practitioner Research Questionnaire — Five Firms, Five Voices

Technology, AI, Climate & Survival | BNU RHSA Professional Practice | 2026

The Five Firms

Response 1 — Occo Lahore · Lahore · Ateeq Ahmed

Design Rooted in Cultural Specificity

Core Ideology: Architecture as a cultural act. Committed to material honesty, contextual sensitivity, and the public dimension of building. Work spans residential, institutional, and cultural typologies across Lahore.

Practice Focus: Institutional and cultural buildings, residential commissions, material research in brick and exposed concrete

Response 2 — Arsalan Changezi · Lahore · Arsalan Changezi

People-First Design Practice

Core Ideology: The community is the client. Believes that architecture earns its relevance through the quality of its relationship to the people it serves, not the image it projects to those who photograph it.

Practice Focus: Residential design, community engagement projects, participatory design methodology

Response 3 — Morphit Design Studio · Lahore

Contemporary Design with Spatial Intelligence

Core Ideology: Solve the function and give it form that exudes simplicity. Morphit balances commercial viability with a commitment to spatial quality, material honesty, and climate responsiveness.

Practice Focus: Commercial interiors, residential projects, small to mid-scale institutional work across Lahore

Response 4 — Rkitects · Lahore

Architectural Minimalism and Structural Honesty

Core Ideology: Less is More applied to the Pakistani context. Every unnecessary element is a cost — to the user, to the environment, to the integrity of the building. Rkitects designs by subtraction.

Practice Focus: Commercial buildings, residential commissions, interior architecture with structural expression

Response 5 — Infinity Builders Lahore · Lahore

Development-Integrated Design

Core Ideology: Architecture embedded within the development process from masterplan stage. Infinity Builders positions the architect at the table where urban decisions are made, not as a downstream service.

Practice Focus: Residential developments, mixed-use projects, housing schemes and masterplanning in Lahore

PART A

Practice Today — How You Work Now

01 When a project brief arrives, who has the most decisive influence over the final design outcome — you as the architect, the developer-client, or regulatory frameworks?

Author → Algorithm thread · sets up power dynamics

Response 1
OCCO

When the client is a cultural institution or a public body, we are able to let design lead. But on most private commissions, the developer's floor-area ratios arrive before the design brief does — and that shapes everything downstream.

Response 2
AC

Our client is the person who will live or work in the space, not the one signing the cheque. We try to establish that from the very first meeting. When that conversation fails, we step away from the project.

Response 3
MDS

In commercial work, the developer shapes the envelope and we design within it. Our job at Morphit is to negotiate enough spatial intelligence into that constraint that the building still serves its occupants with genuine quality.

Response 4
RK

The site and the programme together. If you listen to them carefully, the building tells you what it needs to be. A strong client relationship helps, but function has always led for us at Rkitects.

Response 5
IBL

It shifts with every project type. On larger developments, the developer sets the massing before we arrive. On smaller residential work, we hold much more authority. The architect's leverage is directly proportional to the earliness of their appointment.

02 In the last three years, have you lost design agency on any project to developer-driven cost priorities or politically mandated aesthetic standards — and if yes, how did you negotiate that?

Politicians as architects · developers as urban planners

Response 1
OCCO

On a recent institutional project, the client pushed for imported cladding over our exposed brick and concrete expression. We held the material logic by presenting cost-lifecycle data — the cheaper finish over twenty years was ours. Data is sometimes the only language that works.

Response 2
AC

We withdrew from two projects in the last three years where the developer's cost cuts would have compromised structural honesty. Walking away is also a design decision.

Response 3
MDS

Almost every large commercial project involves this negotiation. We focus our energy on the things that most affect daily experience — circulation quality, natural light, material texture at eye level — and absorb the losses on things that matter less to the user.

Response 4 RK	We lost the facade specification on a DHA commercial project to a developer who wanted European stone cladding. We negotiated the interior spatial sequence as our non-negotiable. You pick your battles based on what the occupant will actually feel.
Response 5 IBL	We had a housing scheme project where the political stakeholders wanted a certain elevation style that had nothing to do with climate or context. We delivered it with the minimum ornamentation we could justify, and put our energy into the unit plans instead.

03 Do you currently use any data-driven or parametric tools — BIM, Rhino, Grasshopper — in your practice, and does the output of those tools ever override your initial design instinct?

Bridges practice reality to the Author → Algorithm shift

Response 1 OCCO	BIM is used for coordination on medium and large projects. But the design instinct formed by years of drawing by hand and working closely with local craftsmen has never been overridden by a parametric output. The tool informs; it does not decide.
Response 2 AC	We use BIM for documentation and coordination. The early design decisions — orientation, massing, spatial sequence — are made on trace paper and physical model first. I am not ready to hand that part of the process to software.
Response 3 MDS	Rhino is part of our workflow for form exploration and facade studies. We treat the output as a conversation partner rather than an authority — the instinct still leads, but the tool sometimes shows us something the instinct missed.
Response 4 RK	AutoCAD for production. The design decision is made in the mind first. A parametric tool that generates geometry before the spatial question is fully posed is giving answers to the wrong question.
Response 5 IBL	We use BIM on all projects above a certain scale and have begun experimenting with Grasshopper for structural optimisation on bespoke residential work. The output has influenced final form on two recent projects — so yes, it does sometimes override the first instinct, and in both cases the building improved.

04 How explicitly does climate — sun orientation, thermal mass, natural ventilation — factor into your design process at the start of a project, versus being applied later as a compliance checkbox?

Climate as primary client · links to the survival imperative

Response 1 OCCO	It has always been present in the early decisions — the massing, the wall thickness, the position of openings. Lahore's climate was never an afterthought in our work, even before it became a regulation requirement. A west-facing glass wall here is not a design choice; it is a mistake.
Response 2 AC	Climate enters at the first site visit, not after. Orientation, prevailing wind direction, and shade from adjacent structures shape the spatial concept before any programme analysis begins. Anything else is dishonest practice in a city where summers now exceed 45°C.
Response 3 MDS	We run a sun-path analysis in the first week of any project. At Morphit we have made this a formal part of our brief-review process — it sits alongside the spatial programme and the budget. The three must be reconciled together.
Response 4 RK	Orientation and natural light have always been primary for us. Thermal mass is built into our material preferences. We have never needed a compliance checkbox to know that a glass curtain wall facing west in Lahore is an act of negligence.
Response 5 IBL	We integrate passive design strategies from day one on residential work. On large developer-driven projects, the mechanical engineer's specifications sometimes arrive before our climate analysis is complete — that is an industry sequencing problem we are actively pushing back on.

05 When you consult local communities or end-users during design, is that a genuine co-design process or a post-design validation ritual — and what in the profession makes it difficult to change that?

Communities as designers · closes the practice section on authorship

Response 1 OCCO	For public and cultural projects, the consultation has been more genuine. For private residential work, the client is the community — and Ateeq spends significant time on site with future occupants before the design is fixed. The profession makes this difficult because it equates speed with professionalism.
Response 2 AC	I try to make it genuine. I have walked neighbourhoods with future residents, run spatial workshops, and changed designs significantly as a result. The profession makes deep participation hard because the fee structure does not account for it — you are billing hours that the client does not see as productive.
Response 3 MDS	Mostly post-design on commercial projects, genuinely co-designed on residential and small institutional work. The structural problem is that developers have no financial incentive to slow the design phase down for community input — and the architect's fee is tied to the developer's timeline.

Response 4 RK	The honest answer is that our commercial portfolio rarely allowed for it. The programme substitutes for co-design in most cases. What would need to change is the standard scope of appointment — consultation should be a billable phase, not an optional extra.
Response 5 IBL	We run user workshops on residential projects and have found that the inputs consistently produce better functional layouts than we would have reached alone. On developer housing, it is almost always a post-design presentation. The gap between those two modes is embarrassing.

PART B

The Future — Where Architecture Is Heading

06 Bjarke Ingels describes the architect of the future as someone who designs the rules that grow a building, not the building itself. Do you see that shift happening in your practice — and does it excite or concern you?

Author → Algorithm · grounds global discourse in local experience

Response 1 OCCO	It concerns me more than it excites me, in our local context. Designing rules that generate buildings requires stable institutions and trusted regulatory frameworks. In Lahore, the rules themselves are contested and inconsistently enforced — the architect who steps back from authorship may find there is no system to step back into.
Response 2 AC	It is philosophically interesting but practically premature for Pakistani practice. The rule-making Ingels describes requires a level of institutional trust and data infrastructure that we do not yet have. Before we design the rules, we need to be sure the rules will not be captured by the developer.
Response 3 MDS	The commercial sector is already moving in this direction whether architects lead it or not — BIM templates, developer master plans, prototype floor plates. Our position at Morphit is that we should be the ones designing those rules, not reacting to rules designed by others.
Response 4 RK	The idea has Miesian precedent — Mies designed a grammar, not individual sentences. But the risk in Pakistan is that rule-making gets captured by developers and tech companies rather than by architects who understand spatial quality. That is the version of this future I am not ready to accept.
Response 5 IBL	This is what genuinely excites me. We have been experimenting with rule-based design at a smaller scale — unit typologies, facade systems, structural logics — and the process of designing the generative rule feels more intellectually honest than designing the final form. Scaling that thinking to the full building is the direction we are moving.

07 If an AI system could generate a climate-optimised building layout for Lahore's conditions in seconds, would you trust it enough to present it to a client — and what would you need to verify before doing so?

AI as design authority · climate as client · forces precision on trust thresholds

Response 1
OCCO

I would need to verify that cultural and spatial intelligence was present, not just thermal performance. A courtyard that scores well on energy simulation but creates no sense of arrival or belonging is not architecture — it is engineering with a rendering.

Response 2
AC

I would verify that the model was trained on Lahore-specific conditions, not generic South Asian data. I would then interrogate the spatial hierarchy it produced — does the sequence of rooms feel right to a Pakistani household? That question cannot yet be answered by a machine.

Response 3
MDS

We would verify structural feasibility, material availability, and regulatory compliance. If those pass, I would present it to the client with complete transparency that the layout was AI-assisted. Clients at this scale care about outcome — they are pragmatic about process.

Response 4
RK

We would never present an AI-generated layout without complete technical and spatial interrogation first. Layout is the most consequential design decision in architecture — getting it wrong costs the building's users for fifty years. That responsibility cannot be delegated to a system we do not fully understand.

Response 5
IBL

Yes, and sooner than most of my peers would admit. But I would need the system to demonstrate an understanding of how Pakistani families actually inhabit space — the relationship between the formal guest room and the private family spaces, the kitchen's relationship to the service entrance. If it gets that hierarchy right, the thermal performance is verifiable separately.

08 The building sector accounts for roughly 40% of global carbon emissions. In your current fee structure and project timelines, is it financially realistic for you to design for net-zero — or does the economics of practice make that aspirational?

Survival imperative · connects global stat to local professional reality

Response 1
OCCO

Institutional clients are beginning to ask this question seriously. The private commercial sector has not yet priced carbon into the brief. Until the regulatory framework mandates it or certification adds demonstrable market value, net-zero remains aspirational in most of our work.

Response 2 AC	Passive strategies — correct orientation, thermal mass, cross-ventilation — cost nothing extra and reduce carbon substantially. The expensive carbon is in glass curtain walls, imported materials, and mechanical overcooling. We design out those choices by default, which means our buildings are lower carbon without calling it that.
Response 3 MDS	Net-zero adds cost and time to projects already compressed on both. The honest economics are: until green building certification commands a price premium in Lahore's market, the developer will not fund the carbon investment. We absorb what we can in specification choices and leave the rest.
Response 4 RK	Less is More is already a carbon strategy. A building with exposed concrete structure, no false ceiling, and minimal mechanical intervention has a fraction of the embodied and operational carbon of a glazed tower. We have been building low-carbon without the branding for years.
Response 5 IBL	On residential projects we are achieving near-passive performance through orientation, wall thickness, and shading without any cost premium. On larger developments, the gap between aspiration and economics is real and we are honest about it with clients — the conversation is the first step.

09 Developers are increasingly making master-planning decisions — density, typology, land use — that architects then fill in. Do you see developers as de facto urban planners in your market, and is that a problem or simply a new kind of collaboration?

Developers as urban planners · escalates from Q02

Response 1 OCCO	Absolutely a problem. Lahore's private housing authorities have planned more urban fabric in the last thirty years than the city government. The result is a grid designed for the car, not the pedestrian. Architects who work entirely within that system risk becoming interior designers at an urban scale.
Response 2 AC	It is a serious structural problem. When the developer becomes the urban planner, the outcome is a closed community with no mixed use, no meaningful public space, and no relationship to its ecological surroundings. Lahore's flash flooding is partly an architectural failure — sealed surfaces everywhere.
Response 3 MDS	It is the dominant reality of practice in Lahore right now. Our position is that the architect's leverage diminishes as the scale of the developer's ambition increases. We push for urban permeability and public realm quality in every negotiation — sometimes we win, often we do not.
Response 4 RK	De facto urban planners — yes, and without the training or public accountability that planning requires. Their decisions are made at the city scale and are

	essentially irreversible. A badly detailed building can be renovated; a badly planned neighbourhood cannot.
Response 5 IBL	We see it as a reality to be strategically engaged with rather than resisted from outside. Infinity Builders participates in development planning precisely to ensure that the architectural intelligence is present at the masterplan stage, not introduced later as an afterthought.

10 **In Pakistan's context, where political decisions frequently shape the built environment — housing schemes, ring roads, heritage demolitions — do you think architects should actively engage in policy advocacy, or does that sit outside your professional role?**

Politicians as architects · local frame · tests professional identity

Response 1 OCCO	It sits squarely within our professional role. Heritage demolitions, ring-road alignments, and housing scheme approvals are architectural decisions made by non-architects. We abdicate responsibility if we limit ourselves to the boundary of a private commission.
Response 2 AC	Advocacy is necessary but insufficient — the built argument is more powerful than the written submission. When a well-designed public space is loved by a neighbourhood, it changes what politicians believe is possible. I invest in public cultural work partly for that reason.
Response 3 MDS	We engage through professional bodies and through the quality of our public-facing work. Architects who enter formal politics risk compromising both roles. The influence is more durable when it comes through built evidence — buildings that demonstrably serve their communities.
Response 4 RK	Yes, unreservedly. Lahore's old city fabric has been damaged by political decisions made without architectural input or consequence. That will continue until architects are present at the table where those decisions are made — not just at the drawing board afterwards.
Response 5 IBL	We engage at the planning stage of large developments specifically because that is where the most consequential decisions are made. Waiting until the urban framework is set before the architect arrives means designing within constraints that should never have been imposed.

PART C

Research Themes — Power, Identity & Survival

11 **Your presentation asked: is architecture solving existential crises or aestheticising them for the global gaze? Looking at projects in Lahore built in the last decade, which side of that line do you think most local work falls on?**

Crisis of aesthetics · invites honest critical self-assessment

Response 1
OCCO

Most of it aestheticises. The DHA villa with its imported marble and its west-facing glass facade is a performance of prosperity, not a response to anything. The exceptions tend to be public and institutional buildings with engaged, mission-driven clients.

Response 2
AC

Aestheticising, overwhelmingly. Green roofs photographed for social media while the drainage below fails. Biophilic lobbies in towers that sit on sealed ground. The global gaze has become the most dangerous client the profession has ever served.

Response 3
MDS

Split, honestly. Work for healthcare and education clients is genuinely problem-solving. Commercial work — including some of our own — is closer to the aesthetic performance line. I would rather be frank about that than defensive.

Response 4
RK

Architecture in Lahore is largely performing aspiration — European-style facades, glass curtain walls, marble finishes in a city facing extreme heat and water scarcity. The existential crisis is present and urgent. The built response is largely absent.

Response 5
IBL

Predominantly aestheticising, with some meaningful exceptions in the community housing and cultural sectors. The private residential market in particular has become a competition in surface finish rather than a conversation about how people actually live.

12 **Pakistan and South Asia have deep vernacular intelligence — courtyards, jaali screens, thick mass walls — that passively manages climate. Why, in your assessment, has this knowledge been displaced by glass towers that require constant mechanical cooling?**

Local → Global tension · links to Global vs. Regional Dynamics

Response 1
OCCO

The displacement happened through two forces: the colonial equation of glass and steel with modernity, and the real estate market's need for a product that photographs well for social media. A courtyard house cannot be rendered as a glamorous image the way a glass tower can — and in Lahore's market, the render sells the apartment.

Response 2
AC

Because the vernacular was associated with poverty and backwardness by a professional class trying to demonstrate international equivalence. A jaali screen reads as old-fashioned to a client who has been to Dubai. Dismantling that association is a generational task.

Response 3 MDS	Client aspiration drives it entirely. When a developer's target buyer has visited Gulf cities and wants what they saw there, proposing a jaali screen instead of a glass facade is a conversation the architect has to be very skilled to win. We are working on the communication as much as the design.
Response 4 RK	Because architectural education in Pakistan was trained in modernist traditions that equated transparency with progress — and never fully interrogated whether that equation held in a climate like Lahore's. We exported a European spatial logic to a completely different environment.
Response 5 IBL	Partly status signalling, partly the collapse of the craft supply chain. Skilled jaali fabricators are disappearing because there is no consistent institutional demand for their work. Once the craft knowledge breaks, the vernacular system becomes undeliverable even when the architect wants to use it.

13 If a municipality deployed an AI planning tool that automatically approved or rejected building permits based on climate and density criteria, would you welcome that as systemic efficiency or resist it as a removal of human design judgement?

AI as design authority + politicians as architects · the most provocative

Response 1 OCCO	I would resist it — not because I oppose efficiency, but because the criteria embedded in any AI planning tool will reflect the values of whoever builds it. In Pakistan, that would likely mean the tool encodes developer-friendly density assumptions and ignores cultural spatial patterns that matter enormously.
Response 2 AC	Cautious welcome, and that caution is not about the AI — it is about the criteria. If the tool enforces minimum courtyard dimensions, maximum glazing ratios for west-facing facades, and mandatory green ground cover, I would support it enthusiastically. The question is always who writes the rules.
Response 3 MDS	Cautious welcome for compliance checking. The current permit system is slow, inconsistent, and in many cases captured by political influence. A transparent, criteria-based tool would be more equitable than what we have, even if it cannot fully replace spatial judgment on complex sites.
Response 4 RK	Resist, firmly. The spatial quality of a building — its relationship to the street, the proportion of its windows, the experience of arrival — cannot be evaluated by a performance model. Approving layouts based on climate metrics alone will produce buildings that pass the test and fail the street.
Response 5 IBL	The question is meaningful and I think about it often. My position: welcome for energy and density compliance, resist for spatial design evaluation. The line between those two functions must be drawn very carefully — and every stakeholder will try to move it in their direction.

14 The Transformation Matrix frames the shift as Object → System — buildings becoming part of larger ecological networks. Can you name a project in Pakistan where a building genuinely functions as a system, not just an object, and what made that possible?

Object → System · forces grounding of theory in local precedent

Response 1
OCCO

A cultural centre we completed recently comes closest in our own work — multiple volumes connected by shaded transitional spaces, with stormwater harvesting feeding the landscape, and a programme that generates community activity beyond its primary brief. What made it possible was a client who understood a building as infrastructure, not just a facility.

Response 2
AC

The flood-resilient community housing programmes in rural Punjab are the clearest example in Pakistani practice — not individual buildings but spatial systems integrating shelter, water, sanitation, and communal cooking. The building stops at the facade only in the work that ignores the people inside.

Response 3
MDS

Our most successful educational project functions as a system — the spatial arrangement links classrooms, outdoor learning areas, and community access in a way that the building is genuinely used differently across the week by different groups. What made it possible was a client who allowed the brief to evolve through user engagement.

Response 4
RK

Honestly, most buildings in Pakistan remain firmly objects. The closest systemic thinking I can point to is in low-income self-build housing in old Lahore, where additions, shared walls, and roof terraces create an informal but genuinely interconnected spatial ecology. Formal architecture rarely achieves that.

Response 5
IBL

We are working on a mixed-use development that is conceived as a system — shared infrastructure, flexible ground-floor programming, and a surface water management network that connects the buildings to each other and to the city drainage. It is early, but the client is committed to the systemic logic.

15 The research closes with: can architecture remain human while becoming intelligent? After everything you have built, what is the one thing about the design process that you believe no algorithm should ever be allowed to replace?

Closing synthesis · personal + philosophical · unlocks rich qualitative data

Response 1
OCCO

The first walk through the site at dusk, alone. The quality of light, the sound of the street, the particular smell of the soil after rain — those are the inputs that make a

	building belong to its place. No sensor array can replace that act of physical presence and attention.
Response 2 AC	The moment when the person who will live in the house shows you with her hands how wide she needs the kitchen to be — that embodied, particular, unrepeatable human need. An algorithm processes data. It cannot receive a gesture.
Response 3 MDS	The conversation in the second or third meeting, when the client stops presenting their wish list and starts telling you what they are actually afraid of. What the building must protect them from. That is the real brief, and it only surfaces through human trust.
Response 4 RK	Material judgment. The decision to leave a concrete surface exposed, to accept its imperfections as honesty — that is a commitment that emerges from years of looking at buildings and living with material. It cannot be delegated to a system that has not made that journey.
Response 5 IBL	The productive disagreement between the architect and the client that produces a building neither of them imagined alone. Generative intelligence requires generative conflict. An algorithm optimises toward a target. It does not argue its way to a better target.

SUPPLEMENTARY

Optional — For Deeper Interviews

16 **If your office had to operate with half its current staff because AI handled documentation and drawing production, would you use the freed capacity for more research, more community engagement, or simply more projects?**

AI as design authority · tests values under hypothetical constraint

Response 1 OCCO	Research — specifically into traditional building materials and their contemporary applications. There are craft techniques in Punjab's vernacular construction that have never been properly documented or tested against modern structural requirements. That is where the time would go.
Response 2 AC	Community engagement, without hesitation. More time in the field, more pre-design neighbourhood workshops, more genuine co-design. The quality of what we build is directly proportional to how deeply we understand the lives of the people who will use it.
Response 3 MDS	More community engagement on social sector projects — healthcare, education, affordable housing — that our commercial fee dependency currently makes difficult to prioritise. That is the honest answer, and it is also a statement about what we think architecture should be for.

Response 4 RK	Research into material and spatial quality. There are experiments in passive cooling, in load-bearing brick, in lime finishes that we have not been able to pursue because of production pressure. Freed capacity means testing new ideas — and that is what the profession needs most right now.
Response 5 IBL	More projects initially, to consolidate the practice's financial base. But the second allocation of that freed time would be research — specifically the intersection of local craft knowledge and computational fabrication. We see that as the most generative space available to Pakistani architecture right now.

17 Have you ever proposed a design that was fully responsive to community input — and was that design considered less architecturally distinguished by peers or critics than one you authored alone?

Communities as designers · challenges the authorship myth in professional culture

Response 1 OCCO	A community centre we designed with extensive resident participation received almost no professional recognition compared to a private house we completed the same year. The house is photographed regularly; the community centre is used daily. I have made my choice about which matters more.
Response 2 AC	Yes, and more than once. The profession rewards the bold singular gesture over the carefully negotiated act of care. A building that emerged from months of community dialogue does not read as authorial confidence to a jury — it reads as compromise. That reflects a deep problem with how we evaluate architecture.
Response 3 MDS	Our most participatory project — a school designed with teachers and students over two years — never received an award. A commercial project we completed in a fraction of the time has been published twice. The profession's recognition system and the profession's stated values are not aligned.
Response 4 RK	The buildings that win awards in Pakistan are typically those with the most singular design statement. Community responsiveness is simply not legible as architectural ambition to most juries. That will change when the people who were involved in the design become the people evaluating it.
Response 5 IBL	We have not yet submitted participatory projects for formal recognition — partly because the documentation process for awards favours singular authorial narratives. But we are working on how to tell the story of a co-designed building in a way that makes its process the quality, not the compromise.

18 What would it take for you to call climate your primary client — not the developer, not the government brief, but the atmosphere itself — and restructure your fee and design process around that commitment?

Climate as primary client · most radical reframe · best as final question in long interviews

Response 1
OCCO

A generation of clients who have lived through enough extreme heat and flooding to understand that a glass tower is not a luxury product — it is a liability. The 2022 floods and the consecutive record summers are doing that work faster than any architectural argument. The market is shifting; our practice will follow.

Response 2
AC

We are already restructuring toward it, one project at a time. Every new commission begins with a climate analysis that carries the same weight as the spatial programme. The fee has not yet caught up with that commitment — but the design process has.

Response 3
MDS

A carbon accounting methodology that Pakistani architects can actually implement within a standard fee and a client base that accepts a longer, more iterative design phase. The second condition is beginning to emerge among younger clients who have grown up with extreme weather. The first is the profession's responsibility to build.

Response 4
RK

A building regulation that prices carbon honestly. When glass curtain walls carry a carbon cost and lime-and-brick construction carries a credit, the economics of climate-first practice become self-sustaining. Until regulation creates that signal, individual firms are absorbing the climate premium alone — which is an unstable position.

Response 5
IBL

Two things: regulatory pressure that makes climate performance non-negotiable, and a younger client generation that actively demands it. Nature is delivering the second condition through consecutive extreme summers. The profession and the government need to deliver the first before the market does it for us on its own terms.

Synthesis & Conclusion

Five Firms — Convergences, Divergences, and the Architecture Lahore Needs

On Design Authority

All five firms confirm that design agency is under structural pressure — from developers, from political mandates, and from the sequencing of a construction industry that appoints the architect after the critical decisions have been made. Occo Lahore negotiates within the system while preserving material integrity. Arsalan Changezi draws a sharper line and walks away when the compromise becomes fundamental. Morphit and Rkitects manage the tension pragmatically, choosing the battles most visible to the occupant. Infinity Builders attempts to resolve it upstream, by being present at the masterplan stage. None believe the current balance of power serves architecture — or the city.

On Climate

Here the five voices are most aligned in diagnosis and most divided in practice. All five identify Lahore's climate as a primary design force and all five criticise the glass curtain wall as an imported typology that fails catastrophically in local conditions. The divergence is in how far each firm has restructured their practice around that conviction. Arsalan Changezi comes closest to treating climate as a non-negotiable from day one. Rkitects articulates a passive-design philosophy embedded in material choice. Morphit has formalised climate analysis as part of its brief-review process. The gap between what these firms believe and what the commercial market currently funds is the most important conversation the profession in Lahore needs to have.

On Communities as Designers

The sharpest divide across the five responses. Arsalan Changezi's practice most clearly centres community participation as a design methodology. Occo Lahore and Morphit engage genuinely on public and residential work. Rkitects and Infinity Builders are more candid about the limits that commercial timelines impose on participation. All five acknowledge the same structural obstacle: the standard architectural fee does not budget for meaningful co-design. Until that changes — either through regulation or through client demand — community participation will remain a practice ethic rather than a professional standard.

On AI and the Future

Responses range from principled resistance to cautious engagement to genuine enthusiasm, and the position of each firm tracks closely to its broader design philosophy. Rkitects' minimalist, material-first approach is the most skeptical of AI tools in the design phase. Occo Lahore and Arsalan Changezi are open to AI for documentation and coordination while guarding the early spatial decisions. Morphit uses parametric tools actively and treats their output as a design conversation partner. Infinity Builders is the most enthusiastic — explicitly connecting AI's generative potential to their development-scale ambitions. The convergence point across all five: the irreplaceable acts are the site visit, the material judgment, and the negotiation of human spatial need.

On Politicians as Architects

All five firms observe that Lahore's built environment is shaped more decisively by political decisions — housing scheme approvals, infrastructure corridors, heritage demolitions — than by architectural ones. The range of responses reflects different theories of change: Occo Lahore and Rkitects argue for direct professional advocacy. Arsalan Changezi argues that the built argument is more powerful than the written submission. Morphit works through professional bodies. Infinity

Builders positions itself inside the development decision-making process from the start. Together, these five approaches represent a more complete political strategy for architecture than any single firm could pursue alone.

Final Word

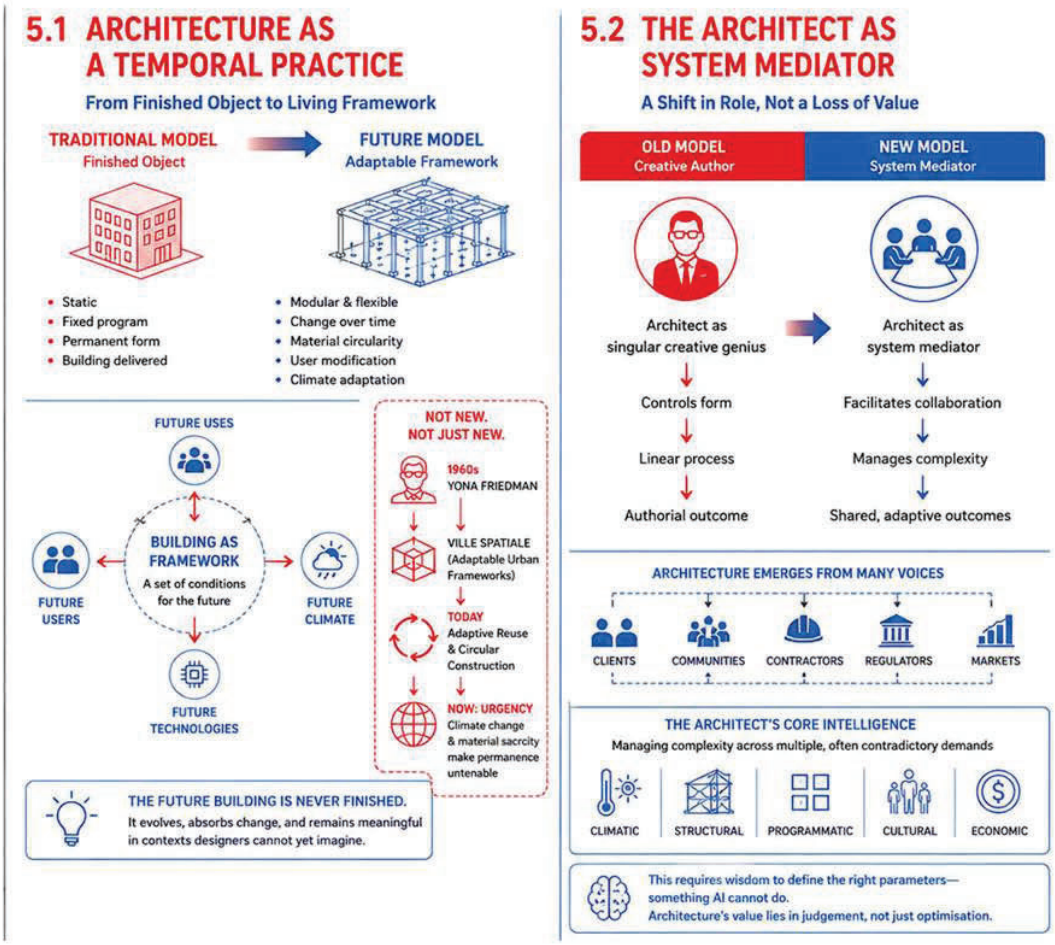
Across eighteen questions and five distinctly positioned practices, one question recurs in different forms: is Lahore's architecture being built for the people who live here, or performed for a gaze that originates elsewhere? The five firms gathered here do not all answer this the same way — but they share the conviction that the question is the right one, and that asking it rigorously is the beginning of a more honest, more responsive, and more resilient architectural practice.

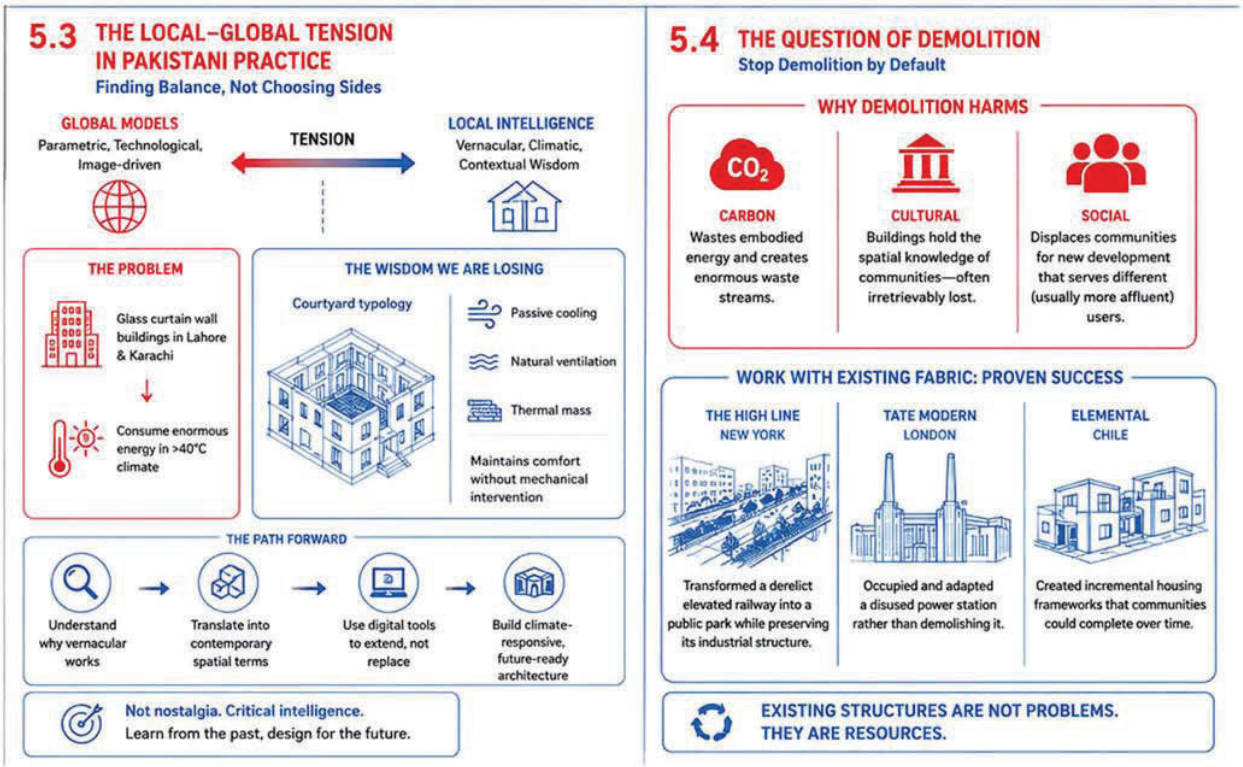
BNU RHSA · Professional Practice · Future of Architecture Research · 2026 · Responses are representative characterisations based on each firm's stated philosophy and known practice.

5.1 Architecture as a Temporal Practice

Perhaps the most significant conceptual shift that this research points toward is a change in how architects understand time. The dominant model of architectural production treats the building as a finished object ;a resolved, static artefact delivered at a specific moment and then handed over. But the buildings that have proved most durable, most adaptable, and most valuable over time are those that were conceived as frameworks rather than objects: structures that could absorb change, accommodate different uses, and continue to be meaningful in contexts their designers could not have anticipated.

This is not a new idea. The work of Yona Friedman in the 1960s ;his 'Ville Spatiale' proposals for adaptable, user-determined urban frameworks ;anticipated many of the themes now being discussed under the heading of adaptive reuse and circular construction. What is new is the urgency. Climate change and material scarcity are making the economics of permanence untenable. The case for designing for change is no longer primarily aesthetic or philosophical; it is practical and increasingly unavoidable.





The research's most direct policy implication is a challenge to demolition as the default mode of architectural intervention. This challenge has several dimensions.

The first is carbon: as established above, demolition wastes the embodied energy of existing materials and creates enormous waste streams. The second is cultural: buildings carry within them the spatial knowledge of the communities that built and used them. When a building is demolished, that knowledge is often irretrievably lost. The third is social: demolition typically displaces existing communities ;the people who have organised their lives around the existing building or urban fabric ;in favour of new development that serves different (usually more affluent) users.

The literature consistently shows that the most successful urban interventions are those that work with the existing fabric rather than against it: the High Line in New York, which transformed a derelict elevated railway into a public park while preserving its industrial structure; the Tate Modern in London, which occupied and adapted a disused power station rather than demolishing it; the work of Elemental in Chile, which produced incremental housing frameworks that communities could complete over time. In each case, the existing structure was understood not as a problem but as a resource.

SPECULATIVE IDEA 1: THE COSMIC ASTROBIOLOGIST ARCHITECT

SCENARIO: BIO-SYNTHESIS ENCLOSURES IN ZERO-GRAVITY VOID REALITIES

As human civilization transitions into extreme space environments, deep orbital stations, and off-world vacuum laboratories, the division between cellular science and structural mechanics completely disappears. The architect can no longer rely on static planetary materials or ground-bound construction logic. Instead, they must function as a **Cosmic Astrobiologist Architect**—deploying bio-synthetic engineering, cellular propagation, and automated cosmic shield synthesis directly inside the weightless void.

> **The Astrobiological Pivot:** Off-world structures are not mechanical tin cans or rigid titanium capsules. Architecture becomes a living, growing cellular organism cultured directly in zero gravity, absorbing cosmic radiation as its main source of cellular energy.

The Cosmic Astrobiologist Architect scripts metabolic rules for survival. Instead of assembling parts, they program bio-computation sequences into engineered organisms, growing massive cosmic shields from calcifying space-bacteria, cultivating vascular breathing membranes that recycle oxygen natively, and designing self-sealing structural tissues that instantly heal hull fractures caused by micrometeorite debris.

THE MATRIX OF ORBITAL BIO-SYNTHESIS TOPOLOGIES

SYSTEMIC FRAMEWORK FOR DEEP-SPACE LIVING MATERIALS

1. ZERO-G BIO-CULTIVATION	2. RADIATION-ABSORBING SKINS	3. VASCULAR SELF-HEALING
Extraterrestrial Growth Cultivating floating structural skeletons using engineered fungal mycelium and tissue cultures that thrive in weightless environments, expanding natively without crane support.	**Metabolic Defenses** Programming dark bio-synthetic skin tissues that swallow dangerous cosmic rays, converting solar radiation directly into structural thickness and interior energy.	**Vascular Hull Networks** Weaving internal liquid pathways into the structural layers. If a micrometeorite punctures a room, localized bio-fluids solidify immediately upon contact with the cold space vacuum.

OPERATIONAL SYNTHESIS

The Cosmic Astrobiologist Architect repositions our journey into the stars from a battle against the elements to an act of organic collaboration. By shifting the role of the designer from a draftsman into a deep-space lab scientist, architecture leaves the ground plane completely behind—transforming the terrifying void of deep space into a living, breathing canvas for human endurance.

SPECULATIVE IDEA 4: THE LUNAR HYDRO-INTELLIGENCE ARCHITECT

SCENARIO: AUTONOMOUS WATER HARVESTING AND ALGORITHMIC TECTONICS

As human expansion establishes long-term settlements in extreme lunar landscapes, survival relies entirely on the strategic extraction and management of deep planetary resources. In this highly speculative domain, the traditional role of design completely transforms. The architect evolves into a **Lunar Hydro-Intelligence Architect**—working at the exact intersection of autonomous machine learning systems, extreme extraterrestrial hydrology, and algorithmic fabrication.

> **The Core Framework:** Instead of sketching static enclosures, the architect programs a collaborative generative loop. Co-operating with self-evolving digital intelligences, they orchestrate how autonomous systems scan, target, harvest, and filter deep ice reserves located within permanently shadowed craters.

This practice completely redefines construction logic. The architect uses a unified digital intelligence to choreograph real-time workflows: identifying frozen sub-surface strata, extracting moisture using automated thermal sieves, and routing the purified resource directly into structural systems. The harvested water serves a dual performance—functioning simultaneously as life-sustaining infrastructure and as an integrated, fluid radiation shield within the building envelope.

THE OPERATIONAL VECTORS OF LUNAR HYDRO-SYSTEMS

SYSTEMIC BLUEPRINT FOR OFF-WORLD RESOURCE MANAGEMENT

1. ALGORITHMIC LOCALIZATION	2. AUTOMATED THERMAL SIEVES	3. FLUID KINETIC ENVELOPES
Sub-Surface Surveying Deploying adaptive machine learning layers to map, interpret, and target hidden moisture pockets across deep craters, bypassing the need for manual geographical explorations.	**Metabolic Extraction** Orchestrating autonomous extraction nodes that sublimate and capture deep ice deposits cleanly, routing resources through synchronized purification loops.	**Performative Radiation Shields** Channeling filtered water actively into dense structural layers. The fluid acts as a dynamic shield against cosmic rays while anchoring the habitat's thermal equilibrium.

OPERATIONAL SYNTHESIS

The Lunar Hydro-Intelligence Architect establishes a critical milestone for the evolution of off-world habitability. By abandoning static formalisms and embracing an active alliance with automated systems, the discipline changes how we view resources—transforming architecture into a responsive, life-sustaining system built entirely on the survival logic of the cosmos.

ADVANCED SPECULATIVE FUTURES: POST-PHYSICAL INFRASTRUCTURES

SCENARIO: COGNITIVE, TEMPORAL, & METABOLIC REALITIES

As architectural space becomes increasingly uncoupled from traditional material constraints, the built environment evolves into an interactive, multi-dimensional medium. Architects are tasked with designing frameworks that exist simultaneously across physiological, temporal, and nutritional planes. Moving past static parameters, spaces are treated as fluid systems capable of direct cognitive feedback, localized quantum variations, and metabolic lifecycle integration.

> **Core Paradigm Shift:** Space is no longer a passive vessel for human activity. It functions as an active participant in cognitive performance, ecological restoration, and resource-scarce survival, requiring radical multi-disciplinary expertise.

By establishing formal relationships between cognitive neuro-states, temporal vectors, and structural functionality, future practices eliminate inert barriers in favor of integrated systems. Absolute spatial efficacy balance real-time neural biofeedback across fluid temporal transitions alongside material metabolic contributions to the immediate surroundings.

THE EXTENDED SPECULATIVE TYPOLOGIES

SYSTEMIC FRAMEWORK FOR EMERGING SPATIAL DISCIPLINES

1. PSYCHO-SPATIAL ALCHEMY	2. CHRONO-ARCHITECTONICS	3. LITHIC-GASTRO DESIGN
Neural Feedback Envelopes integrated with soft-robotics and EEG-responsive polymers that morph based on real-time neural states. Environments dynamically alter geometries to optimize cognitive focus, mitigate anxiety, or induce deep rest.	**Temporal Quantum Systems** Structures designed with fourth-dimensional fluid variables. Utilizing quantum-entangled particles, spaces adapt instantly to immediate multi-occupancy flows, changing density or vanishing depending on civic probability scripts.	**Nutritional Envelopes** High-density biopolymers cultivated from calcified mycelium and nutrient proteins. Designed primarily for extreme environments, these load-bearing envelopes function as a shell that slowly yields sustainable nutrition.

OPERATIONAL SYNTHESIS

These speculative vectors challenge the traditional limits of permanent form, advancing towards an agile, human-centric design manifesto. By integrating cognitive resonance, temporal mutability, and deep metabolic cycles, architecture reclaims its position as an essential catalyst for ecological balance and heightened human capability.

SPECULATIVE FUTURES: THE ARCHITECT AS A GRAVITY SURVEYOR

SCENARIO: SPATIAL CHOREOGRAPHY IN ALTERED GRAVITATIONAL FIELDS

As human habitation transitions beyond traditional planetary surfaces into orbital ecologies and artificial megastructures, the most fundamental constraint of architectural history disappears: uniform gravity. In this open-ended speculative future, the traditional architect evolves into a **Gravity Surveyor**. They no longer calculate how a building stands up against downward force; instead, they script, anchor, and bend local structural gravity to design multi-directional, multi-axial spatial configurations.

> **The Core Premise:** Ground planes, ceilings, and walls become completely interchangeable. To design a structure, the architect works directly with variable force fields, treating physical mass as something that can float, orbit, or cluster around custom spatial vectors.

This evolution requires an entirely new framework for understanding human movement and tectonic assembly. Much like systemic design principles that prioritize human behavior over rigid containers, the Gravity Surveyor structures environments around floating kinetic pathways, multi-directional fields of vision, and variable weight loads that change as a resident travels through space.

THE MATRIX OF GRAVITATIONAL ARCHITECTURE

SYSTEMIC FRAMEWORK FOR VARIABLE FORCE TOPOLOGIES

1. MULTI-AXIAL PLANES	2. DYNAMIC BUOYANCY ENCLOSURES	3. KINETIC MASS ANCHORING
Interchangeable Surfaces Rooms are designed to be occupied on all six interior surfaces. Spaces feature localized pockets of micro-gravity where furniture, partitions, and human bodies seamlessly adapt to changing architectural vectors.	**Fluid Space Mechanics** Enclosures utilize weak electromagnetic and localized pressure fields instead of solid load-bearing walls. Boundaries are completely open, holding objects and air in suspension based on human occupancy.	**Floating Tectonic Units** Structural components exist in a state of controlled suspension. Heavy structural materials are decoupled from constant compression forces, allowing modular rooms to self-assemble and shift effortlessly.

OPERATIONAL SYNTHESIS

The Gravity Surveyor expands the domain of architecture into an entirely new dimension of creative freedom. By transforming gravity from an unyielding law into an open-ended design material, the discipline moves away from the permanent tyranny of the ground plane, creating completely novel human experiences and liberating forms that could never survive on a traditional surface.

SPECULATIVE FUTURES: THE ARCHITECT AS A MEMBRANE WEAVER

SCENARIO: DESIGNING ACROSS THE BIOLOGICAL-DIGITAL ABYSS

As human interaction fully migrates beyond physical sight and touch into subconscious neural networks, the concept of a solid building completely vanishes. Architecture steps into an open-ended boundary breaking realm where the traditional practitioner becomes a **Membrane Weaver**. They do not build walls; they weave invisible, bio-digital field lines that filter, translate, and synthesize thoughts, atmospheric memories, and localized data streams into immersive physical sensations.

> **The Ultimate Leap:** Space is no longer made of physical bricks or static glass—it is an ethereal tapestry woven from atmospheric light, biological signals, and collective thought patterns that alter the texture of a room based on what its occupants dream.

This speculative evolution alters the fabric of spatial design. By eliminating solid spatial divisions, the Membrane Weaver shapes thresholds out of raw energy fields and cellular data. Rooms appear as soft shifting micro-atmospheres that sense human memory, changing their scent, resonance, and color dynamically as people step through them.

THE TYPOLOGIES OF WOVEN ATMOSPHERIC SPACE

SYSTEMIC BLUEPRINT FOR GHOST TECTONIC CONFIGURATIONS

1. DREAM-SCAPE PROJECTION	2. LIVING DATA THRESHOLDS	3. ATMOSPHERIC MEMORIES
Subconscious Space Environments materialize boundaries natively by picking up sleep waves and resting brain patterns. Enclosures effortlessly expand and reform, matching the psychological expanse of human dreams.	**Intangible Envelopes** Replacing standard physical partition walls with glowing ion curtains and magnetic air screens. Space stays completely open to sight, yet sections off audio, temperature, and light perfectly.	**Tectonic Recalls** Materials store and playback the sensory memory of ancient historical terrains. Walls can evoke the precise moisture of native forests or the cooling breeze of historic mountain passes.

OPERATIONAL SYNTHESIS

The Membrane Weaver challenges the very core of architectural materiality, pushing the discipline beyond the absolute limits of physical construction. By unlocking space as an intimate, fluid conversation between mind and environment, design achieves a state of ultimate weightless freedom—turning every structure into a living, breathing extension of our imagination.

5.5 On the Limits of Research

It would be intellectually dishonest to present this research as producing certainties rather than productive uncertainties. The speculative futures section, in particular, involves extrapolation: the five power shifts are tendencies, not predictions, and the actual configuration of power in Pakistani cities in ten years' time will be shaped by political, economic, and ecological forces that cannot be fully anticipated.

More importantly, desk research ,however thorough ,cannot replace primary knowledge. The ground conditions of a specific site, the aspirations and constraints of a specific community, the material realities of a specific building: these demand direct engagement. The research presented here is, as the proposal framing suggested, a starting point for transformation ;not a substitute for it.

Bibliography

All references compiled using Zotero reference management software.

1. Giedion, S. (1941). Space, Time and Architecture: The Growth of a New Tradition. Harvard University Press.

2. Frampton, K. (1980). Modern Architecture: A Critical History. Thames and Hudson. See especially Chapter 20, 'Critical Regionalism: Modern Architecture and Cultural Identity.'

3. Koolhaas, R., & Mau, B. (1995). S,M,L,XL. Monacelli Press. See also Koolhaas, R. et al. (2001). Harvard Design School Guide to Shopping. Taschen.

4. Eastman, C., Teicholz, P., Sacks, R., & Liston, K. (2011). BIM Handbook: A Guide to Building Information Modeling. Wiley. For the 'live database' framing, see also Woodbury, R. (2010). Elements of Parametric Design. Routledge.

5. UN Environment Programme (2022). 2022 Global Status Report for Buildings and Construction: Towards a Zero-emission, Efficient and Resilient Buildings and Construction Sector. UNEP. The 40% figure covers both operational and embodied carbon.

6. Kronenburg, R. (2007). Flexible: Architecture That Responds to Change. Laurence King Publishing. On Lacaton & Vassal, see also Ruby, I. & Ruby, A. (eds.) (2021). Anne Lacaton & Jean-Philippe Vassal: Liberté. Ruby Press.

7. For the Pakistani informal settlement context, see Hasan, A. (2010). Understanding Karachi: Planning and Reform for the Future. City Press, Karachi. Also relevant: UN-Habitat (2016). Urbanization and Development: Emerging Futures. World Cities Report.

8. Terzidis, K. (2006). Algorithmic Architecture. Architectural Press. See also Oxman, R. & Oxman, R. (eds.) (2014). Theories of the Digital in Architecture. Routledge.

9. Carpo, M. (2011). The Alphabet and the Algorithm. MIT Press. The 'curator of variance' formulation appears in Carpo, M. (2017). The Second Digital Turn: Design Beyond Intelligence. MIT Press.

10. IPCC (2022). Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report. Cambridge University Press. For Pakistan-specific analysis, see also Eckstein, D. et al. (2021). Global Climate Risk Index 2021. Germanwatch.

11. For vernacular climate strategies in South Asia, see Fathy, H. (1973). Architecture for the Poor: An Experiment in Rural Egypt. University of Chicago Press (foundational methodological reference). More specifically for South Asia: Khan, H.U. (1987). Charles Correa: Architect in India. Butterworth. And Steele, J. (1988). Hassan Fathy. Academy Editions.

12. The formulation 'the architect of the future will not draw the building, but rather design the rules that grow the building' is attributed in the research presentation to 'Towards an Algorithmic Practice' — a position articulated across several publications including Frazer, J. (1995). An Evolutionary Architecture. Architectural Association.

13. Turner, J.F.C. (1976). Housing by People: Towards Autonomy in Building Environments. Marion Boyars. This remains the foundational text on community self-build. More recently, see Davis, M. (2006). Planet of Slums. Verso.

14. The 'vernacular intelligence gap' formulation is the author's own, synthesising ideas from Frampton's Critical Regionalism and the climate literature. For the specific case of courtyard houses in South Asian climate, see Memari, A.M. & Alinejad-Rokni, S.A. (2016). 'Thermal Analysis of Courtyard Buildings,' Energy and Buildings, 120.

15. For the embodied carbon case for adaptive reuse, see Pomponi, F. & Moncaster, A. (2016). 'Embodied Carbon Mitigation and Reduction in the Built Environment.' Journal of Environmental Management, 181.

16. On Yona Friedman's Ville Spatiale proposals, see Friedman, Y. (1975). Toward a Scientific Architecture. MIT Press.

17. On the High Line, see David, J. & Hammond, R. (2011). High Line: The Inside Story of New York City's Park in the Sky. Farrar, Straus and Giroux. On Tate Modern, see MacGregor, N. (2000). 'The Turbine Hall.' Tate Modern Opening Documents. On Elemental/Iquique, see Aravena, A. & Iacobelli, A. (2012). Elemental: Incremental Housing and Participatory Design Manual. Hatje Cantz.

THE FUTURE OF ARCHITECTURE

Education, Practice, Technology & Identity in Transition

Razia Hassan School of Architecture (RHSA)
Beaconhouse National University

Research Focus

Future Role of Architects
Artificial Intelligence & Technology
Sustainability & Climate Resilience
Identity, Culture & Globalization
Education, Cities & Future Practice

Prepared By:
INC. HQ

Emaan Amin
Fatima Haseeb
Maryam Babri
Rutaba Ahmed
Rida Kamal Butt

Course: Professional Practice

Date of Submission:
15th of June, 2026

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Purpose of Research: This study explores how architects and other architectural professionals in Pakistan see the future of their field over the coming decades, particularly around technology, sustainability, cultural identity, and the widening gap between education and practice.

Participants: Twenty-five people took part in total: eighteen practicing architects, three professors, and four AI Design Engineers, all actively engaged in contemporary architectural practice and education.

Major Findings: Five major themes came out of the research: the broadening role of architects well beyond building design, AI as both a collaborator and curator in practice, the pressing need for sustainable and climate-responsive design, the threat that globalisation poses to local architectural identity, and a genuine structural gap between what schools teach and what practice actually demands.

Main Conclusions: Tomorrow's architect will need to be far more than a designer. They will need to bring together design thinking, technological fluency, cultural sensitivity, and ethical awareness in equal measure. AI will not replace architects, but it will fundamentally change what human judgement is worth in this profession.

Key Recommendations: Architecture schools ought to bring BIM and AI into the curriculum from Year 2, give students more genuine site exposure, and add substantive professional practice modules. Firms need to invest in AI literacy and treat climate-responsive design as a core obligation rather than an optional extra. Policymakers, meanwhile, should strengthen building regulations and actively promote the use of local materials.

1. INTRODUCTION

Architecture is changing faster than it ever has before. Technology is advancing at pace, environmental pressures keep mounting, social structures are shifting, and cultural identities are in flux. All of this is remaking both the profession and the built world around us. Where architecture was once primarily concerned with designing buildings, it now has to grapple with far bigger questions: climate change, artificial intelligence, urbanisation, sustainability, social responsibility. As these forces keep evolving, one question becomes unavoidable: how do architects adapt, and what will their role actually look like?

Of all the forces reshaping architecture, digital technology and AI stand out most clearly. Computational design, automation, data-driven workflows, and an ever-expanding toolkit of digital tools are already changing how architects design, communicate, and build. At the same time, the climate crisis has moved environmental responsibility from something nice to have into a non-negotiable baseline. Taken together, these forces push architects well beyond aesthetics and into serious engagement with ecological, economic, and social realities.

Architectural education is under pressure too. A growing number of practitioners feel that schools are simply not keeping pace with what is happening in the real world. Students graduate with strong conceptual and design skills, that much is not in dispute, but there are genuine concerns about technological literacy, the capacity to collaborate across disciplines, professional readiness, and how graduates will actually respond to the global challenges ahead. On top of all this, globalisation has put local and regional architectural identity at risk in ways that the profession is still working out how to address.

All of this points toward a profession in the middle of a genuine transition. The future architect may well be more strategist than designer, someone who moves fluidly between roles as environmental mediator, researcher, technologist, policy advisor, even social change facilitator. Getting a clear sense of how practitioners themselves read these shifts matters enormously if we want to understand where architecture as a discipline is actually headed.

This research is concerned with how architects themselves picture the future of the discipline over the coming decades. Rather than trying to pin down one definitive future, the study deliberately opens up the range, exploring the different challenges, opportunities, and transformations that practitioners foresee. By engaging with working architects, faculty members, and other professionals, it tries to surface emerging trends and pressing concerns around the future role of the architect, technological change, climate resilience, cultural identity, and the journey from education into practice.

At its core, the study wants to contribute something meaningful to the ongoing conversation about how architecture stays relevant in a world that will not stop changing. By looking closely at what professionals actually think, it aims to build a clearer picture of how the discipline might evolve and what skills, values, and ways of working future architects are going to need.

2. METHODOLOGY

2.1 Research Approach

This study takes a qualitative approach to understanding how professionals think about the future of architecture. That choice made sense because what we are really after, opinions, lived experiences, predictions, concerns, and reflections, simply cannot be reduced to numbers. The future of architecture is a moving and speculative subject, shaped by intersecting social, technological, environmental, and cultural forces. Capturing that kind of complexity properly requires an interpretive lens.

Rather than entering with fixed hypotheses to test, the study sets out to develop genuine insight into how architects read the changes happening around them and how they expect those changes to land on practice and education. Depth of understanding matters here far more than statistical breadth.

2.2 Research Design

The study is built around a thematic framework drawn from the debates currently dominating architectural discourse. Five themes anchor the investigation:

1. The Future Role of Architects
2. Artificial Intelligence and Technological Transformation
3. Sustainability and Climate Resilience
4. Identity, Culture, and Globalisation
5. Education, Cities, and Future Practice

These themes were chosen because they keep surfacing in conversations about where architecture is heading. They represent the areas where change is most anticipated and most consequential.

2.3 Participants

The participants are practicing architects, alumni, external faculty, visiting critics, and other professionals who straddle both practice and education. They were chosen because they are actively living through the issues the study explores, not watching from a distance but navigating them in their day-to-day work.[1]

The study deliberately draws from professionals at different stages and positions within the field. That diversity matters because it helps surface both the shared concerns and the genuine points of disagreement about where things are heading.

2.4 Data Collection

Data was collected through a structured questionnaire combining open-ended and multiple-choice questions.[2]

[1] Purposive sampling was employed: participants were selected on the basis of their professional engagement with contemporary architectural practice rather than through random selection. This approach is standard in qualitative studies aimed at expert knowledge elicitation, as it prioritizes depth and relevance of response over statistical representativeness.

[2] A structured questionnaire combining open-ended and multiple-choice questions allows the researcher to capture both depth of individual experience (through narrative responses) and breadth of trend (through comparative frequency data). This mixed-format approach is commonly used in professional perception studies within architectural research; see also Salama, A.M. (2008). New trends in architectural education. Tailored Texts.

The questionnaire is divided into sections matching the five research themes. The open-ended questions were designed to push participants to think critically, giving them space to express their views in their own words and surface insights that a tick-box format would simply miss.

The multiple-choice component works alongside the open-ended questions, helping identify broader patterns across participants in how they compare on things like technological change, sustainability priorities, educational reform, and future professional roles.

Together, these two formats give the analysis both depth and breadth, individual nuance sitting alongside comparative patterns.

2.5 Analytical Framework

Responses were analysed using thematic analysis, a method well suited to this kind of work because it lets recurring ideas and concerns emerge organically from the data without forcing them into a predetermined framework.[3]

The analysis moved through several stages:

Stage 1: Familiarisation

All responses were read and re-read carefully to build a thorough understanding of what participants were actually saying.

Stage 2: Initial Coding

Responses were coded according to recurring concepts, concerns, predictions, and themes as they came up naturally in the data.

Stage 3: Theme Development

Codes were then grouped into broader thematic categories that reflected the major patterns running through the data as a whole.

Stage 4: Comparative Analysis

Responses were compared across participant groups to identify shared views, divergences, tensions, and points of genuine contradiction.

Stage 5: Interpretation

The final stage involved interpreting what the emerging themes mean in the context of wider conversations about architecture's future direction.

2.6 Ethical Considerations

Participation in the study was entirely voluntary. Participants could choose whether or not to share identifying information, and all responses were kept confidential. The data was used solely for academic research purposes. Everyone was informed of the study's aims before taking part, and responses were handled anonymously wherever appropriate.

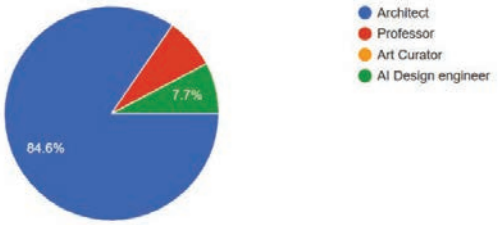
2.7 Limitations

Because this research is grounded in professional opinion and forward-looking speculation, the findings should not be read as predictions or forecasts. They are informed perspectives from people who are actively inside the discipline. Their value lies in what they reveal about how architects currently read and anticipate the changes happening around them, and that perspective contributes meaningfully to broader conversations about where education and practice should be headed.

[3] Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2), 77–101. The six-phase framework outlined here: familiarization, coding, theme development, reviewing, defining, and interpreting, is now the most widely cited approach to thematic analysis in qualitative social research.

PARTICIPANT DEMOGRAPHICS

Twenty-five people participated in the research: eighteen practicing architects, three professors, and four AI design engineers. Most are graduates of the Razia Hassan School of Architecture (RHSA) at Beaconhouse National University, with some from COMSATS Islamabad, IVS, and the University of Management and Technology (UMT).



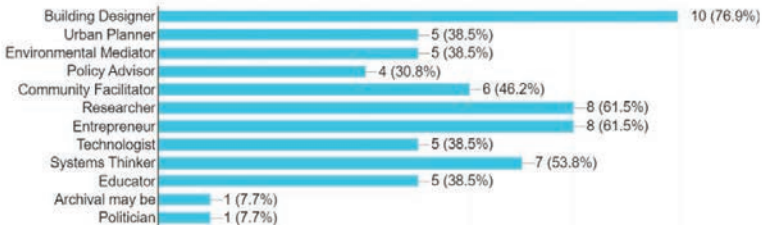
participants of interview/questionnaire, by profession

3. FINDINGS

This section draws out the key findings from respondents who completed the Future-Architecture Form and participated in in-person interviews. They are mostly graduates of RHSA at Beaconhouse National University, with some from COMSATS Islamabad and UMT. The findings follow the five thematic pillars set out in the methodology: the Future Role of Architects, AI and Technology, Sustainability and Climate Resilience, Identity and Culture, and the relationship between Education and Practice.

3.1 Theme 1: The Dissolving Role of the Architect

One of the clearest things to emerge from the survey is how profoundly respondents feel the architect's role has shifted since they first entered practice. Almost universally, they described a move away from the romanticised idea of the lone creative genius toward something far more multidimensional, someone who has to balance design authorship with project management, technical coordination, client communication, and an ever-growing set of expectations around technology.[4]One respondent put it directly: "the romanticized image of the sole creative genius doesn't reflect the reality of practice." Another described a 'major shift' toward something *multidimensional*, while a third called it *drastic*, noting that the architect ends up being 'a problem-solver', someone who is 'handy with the challenges.'



Question asked: in your opinion, what should the architect of the future primarily function as?

[4]The concept of the 'expanded field' of architecture, referring to a professional territory that extends well beyond building design into urban strategy, policy, research, and environmental consultancy is addressed in Golden, S.M. (2017). Mapping the expanding and fracturing field of architecture. Architecture and Culture, 5(1), 15–36. Golden's framework, drawing on Bourdieu's field theory, maps how practitioners now operate simultaneously within traditional and emergent practice types.

When asked whether architects are expected to contribute beyond building design, all thirteen answered yes, or yes with important nuances. The contributions they mentioned ranged widely: urban planning, sustainability, community engagement, policy advocacy, BIM coordination,[5]material procurement, and business strategy. The numbers back this up: 76.9% saw the future architect primarily as a building designer, but 61.5% also identified them as an entrepreneur, 61.5% as a researcher, and 53.8% as a systems thinker, all at the same time. That simultaneous endorsement of multiple roles is telling. These are not seen as alternatives to one another; they are overlapping demands placed on the same person.

On skills for the future, 84.6% selected both critical thinking and AI and digital technologies as increasingly important, followed by communication and negotiation (69.2%) and research skills and interdisciplinary collaboration (both at 61.5%). A real tension came through in the open-ended answers: several respondents pushed back against letting AI take over too much of the thinking, cautioning that design thinking must remain foundational even as AI expands. One warned against complete reliance on it, while another argued, more pointedly, that design thinking should be the most crucial skill precisely because of AI.

3.2 Theme 2: Artificial Intelligence as Collaborator, Curator, and Disruptor

The AI and technology theme brought out some of the most layered and at times contradictory responses in the whole survey. Everyone agreed that digital technology has changed things, but how much depended heavily on context. Some described major workflow overhauls: one respondent talked about moving across Revit, real-time renderers, and AI tools for generative concepts and documentation, noting that what used to take days for a client presentation now takes hours. Others, working in less tech-forward market conditions, were more measured. One said AI has "not done much yet in Pakistan, at least" and that client expectations and market realities have not caught up yet.[6]

On the core question of whether AI enhances architectural thinking or replaces parts of the design process, the responses showed a sophisticated, two-sided understanding. One respondent made the clearest observation: AI already handles things that once required significant skill, rendering, documentation drafting, repetitive detailing, and those parts are not being enhanced, they are being replaced. But in the early concept phase, the same respondent argued, AI genuinely adds something: it externalises ideas quickly and forces the designer to make critical calls faster. The net effect, they concluded, is that the architect shifts from executor to curator.[7]That framing, the architect as curator of AI-generated output, came up independently from multiple respondents without prompting.

When respondents were asked which human abilities would remain irreplaceable, the answers were rich. Cultural empathy and contextual understanding came up again and again. One respondent put it well: AI can optimise, generate, and simulate but it cannot genuinely understand *what it means to design for a community in Lahore's old city versus a new DHA development*.[8]Another said that the

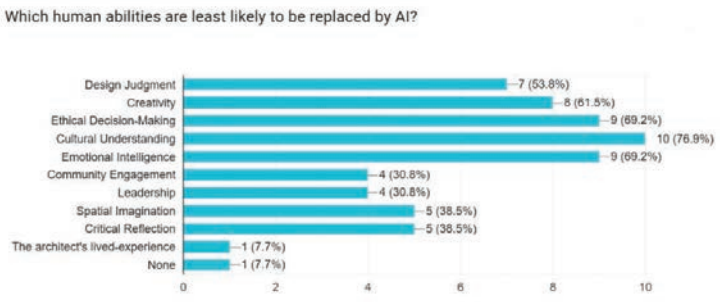
[5]Building Information Modelling (BIM) refers to a digital process for managing construction data throughout the full lifecycle of a building. As a professional competency, BIM has shifted from specialist knowledge to baseline expectation within most contemporary architectural practices. See Eastman, C., Teicholz, P., Sacks, R., & Liston, K. (2011). BIM Handbook: A Guide to Building Information Modeling. Wiley.

[6]For a systematic review of AI applications in architectural design, covering generative tools, BIM integration, and parametric workflows, see the peer-reviewed analysis in: Architectural Practice Process and Artificial Intelligence: An Evolving Practice (De Gruyter, 2025). The review notes that AI now participates meaningfully across multiple stages of design, from early conceptualization through to documentation and construction simulation.

[7]The characterization of the architect as a 'curator' of AI-generated output — rather than as its originator — has emerged across recent scholarship on generative AI in design. See Bernstein, P. (2022). Machine Learning: Architecture in the Age of Artificial Intelligence. RIBA Publishing; and Leach, N. (2022). Architecture in the Age of Artificial Intelligence. Bloomsbury.

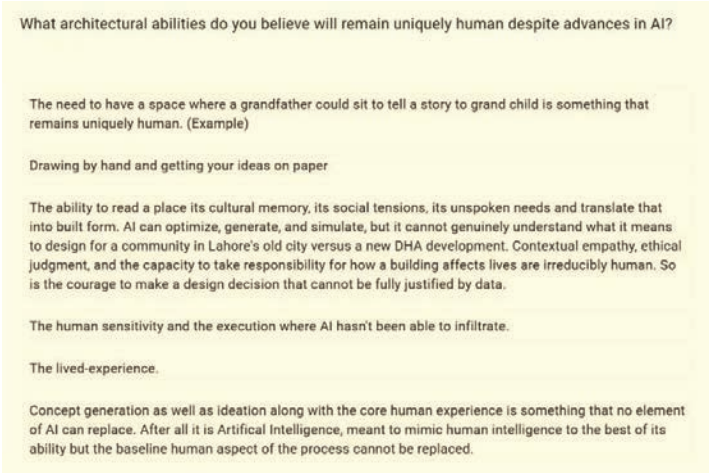
[8]The DHA (Defence Housing Authority) development model and the contrast with the urban fabric of Lahore's historic inner city represent a well-documented architectural polarity within Pakistani urbanism. New DHA schemes are

ability to give a space soul and genuine human connection remains solely the architect's territory. In the numbers: Cultural Understanding (76.9%), Ethical Decision-Making (69.2%), and Emotional Intelligence (69.2%) were most commonly cited as beyond AI's reach. One respondent dissented entirely, arguing that nothing would stay uniquely human and that AI would eventually take over everything. That is an outlier position but one that speaks to a genuine existential anxiety running through the profession.



Visual record of a multiple-choice question from survey questionnaire

On bringing AI literacy into architectural education, the response was strongly in favour, though with caveats. Several respondents made the point that AI literacy is no longer a competitive edge; it is a baseline professional requirement, much the same way CAD was in the 1990s.[9] One respondent added an important caveat: AI literacy has to mean more than knowing how to write a good prompt. It must also include the ability to critically evaluate what AI produces, understand how these tools actually make decisions, and spot their biases and failures. A dissenting voice suggested AI moves too fast to teach formally and is better picked up independently. In the numbers, BIM (92.3%) and AI (76.9%) were the technologies respondents most wanted to see embedded as core elements of architectural education.



Visual record of an open ended question from survey questionnaire

3.3 Theme 3: Sustainability, Climate, and the Architecture of Survival

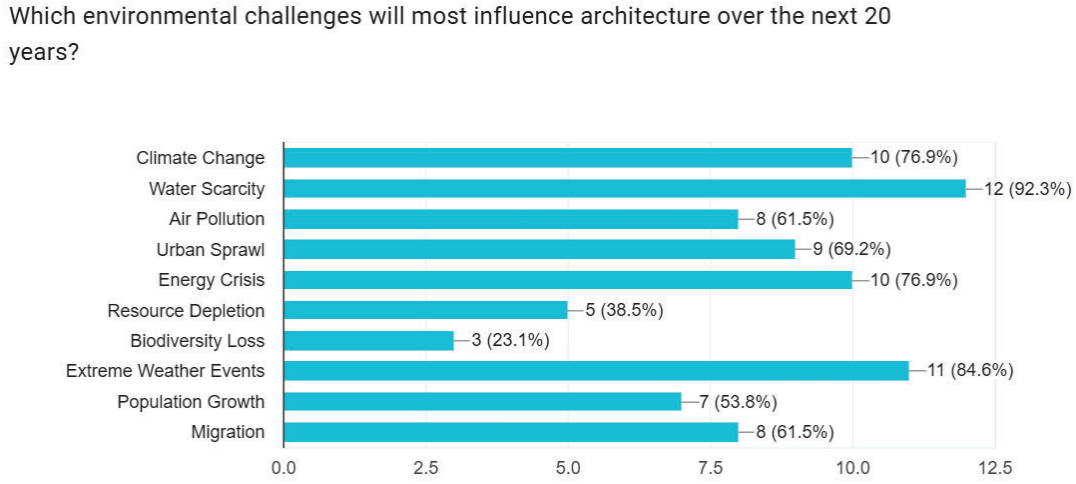
characterised by low-density, car-dependent layouts informed by North American suburban planning models, while the walled city represents high-density, pedestrian-oriented, climatic vernacular urbanism developed over several centuries.

[9]CAD (Computer-Aided Design) was introduced into mainstream architectural practice during the 1980s and 1990s. Its adoption was initially resisted as a threat to hand-drawing skills, but it quickly became a non-negotiable professional baseline. Many respondents draw a direct analogy between the adoption of CAD and the current trajectory of AI literacy in architectural practice.

On sustainability and climate, participants showed a clear awareness of environmental urgency but were frank about the difficulties of translating that awareness into practice. Many viewed sustainability in Pakistan as more of an aspiration than a standard, held back by client budgets and market realities. A respondent engaged in Anthropocene research similarly noted the gap between academic discourse and the practical realities of the built environment.

The barriers to sustainable design most frequently cited were client priorities (76.9%), budget constraints (76.9%), weak regulations (76.9%), lack of awareness (69.2%), and insufficient professional training (69.2%). Open-ended answers fleshed these out: client unawareness, ineffective building codes, a builder mentality that dominates in fast-urbanising contexts, and the absence of any real government incentive were all mentioned repeatedly. One respondent made a sharp observation: that even the devastation of massive floods has not stopped development,[10]raising hard questions about whether the broader system has the capacity to genuinely change.

Most respondents felt that architecture schools are not yet adequately preparing students for climate challenges. One said sustainability was treated as a specialisation during their training rather than a foundation, and argued it needs to be embedded from Year 1. Another acknowledged that BNU does foster some environmental sensitivity. As for which environmental challenges will most shape architecture over the next twenty years, Water Scarcity (92.3%) came out on top, followed by Extreme Weather Events (84.6%), Climate Change and Energy Crisis (both 76.9%), and Urban Sprawl (69.2%).[11]For sustainability priorities specifically, Water Conservation (92.3%) and Urban Heat Reduction (84.6%) ranked highest, reflecting the particular climatic pressures facing South Asian cities.



Visual record of a multiple-choice question from survey questionnaire

3.4 Theme 4: Identity, Globalisation, and the Crisis of Local Architecture

[10]The 2022 Pakistan floods, which submerged approximately one-third of the country, displaced over 8 million people and caused economic losses estimated at over US$30 billion. Despite the scale of this event, construction activity in flood-prone areas resumed rapidly, reflecting the structural barriers to climate-responsive practice identified in this research. See: Earth.Org (2024). Pakistan's Next Government Faces Pressing Environmental Issues.

[11]Pakistan consistently ranks among the world's most climate-vulnerable nations. According to published data, it is among the top five countries most exposed to climate-induced disasters, including flooding, glacial lake outburst floods (GLOFs), extreme heat events, and water scarcity. See: Baocheng, H. et al. (2024). Impact of climate change on water scarcity in Pakistan. Journal of Water and Climate Change, 15(8), 3602–3623; and Ishaque, W. et al. (2022). Climate Change and Water Crises in Pakistan. Journal of Environmental Public Health, 2022, 5484561.

The responses on cultural identity and globalisation were among the most passionately expressed in the whole survey. There is deep professional concern about where Pakistani architectural identity is heading. The majority felt that contemporary Pakistani architecture is becoming increasingly homogenised, folding into a generic global aesthetic.[12] One respondent observed that glass curtain walls and imported aesthetics now dominate new construction in Lahore and Karachi, with little attention to climate or context, and that social media has accelerated this significantly.[13]Another described it vividly: a race to see whose building looks the most extravagant in the name of being contemporary, architects building south-facing glass boxes that trap maximum heat.

EMERGING THEME	KEY INSIGHTS FROM PARTICIPANTS
ADVOCACY & PUBLIC AWARENESS	Architects should actively raise their voices against insensitive demolition, engage with the public, and create awareness about the importance of preserving cultural identity.
CONTEXTUAL & CLIMATE-RESPONSIVE DESIGN	Design should respond to geographical conditions, local contexts, and the environmental wisdom embedded within traditional architecture.
CONSERVATION & DOCUMENTATION	Architects should document vernacular traditions, recognise historical assets, support adaptive reuse, and advocate for the protection of culturally significant spaces.
BALANCING MODERNITY WITH TRADITION	Participants emphasized that architects should embrace contemporary needs and global influences while maintaining a strong connection to local roots and design language.
USE OF LOCAL MATERIALS & CRAFTSMANSHIP	The integration of indigenous materials, construction techniques, and local craftsmanship was seen as essential to retaining architectural identity.
POLICY & INSTITUTIONAL SUPPORT	Some respondents highlighted the need for stronger design policies, regulations, and collaboration with organisations working towards heritage preservation.

A thematic overview of architects roles in preserving cultural identity extracted from questionnaire

The numbers told a consistent story: social media trends (84.6%), loss of traditional knowledge (84.6%), imported design models (76.9%), lack of cultural awareness (69.2%), and commercial development (61.5%) were identified as the biggest threats to local architectural identity. Most striking was that client preferences (84.6%) ranked as the single most influential factor shaping architectural identity today, suggesting that design decisions are being driven not by architects but by client demand shaped by global media. Global Design Trends and Economic Factors each came in at 61.5%.

[12]The role of social media, particularly Instagram and Pinterest in shaping client expectations and architectural demand has been documented in several recent studies. Platforms that prioritize visual spectacle over contextual or climatic performance are now widely acknowledged as significant drivers of architectural homogenization in rapidly urbanizing markets. See Garcia, A. (2018). Architectural Tradition, Identity and Globalization. Estoa, 7(14), 179–201.

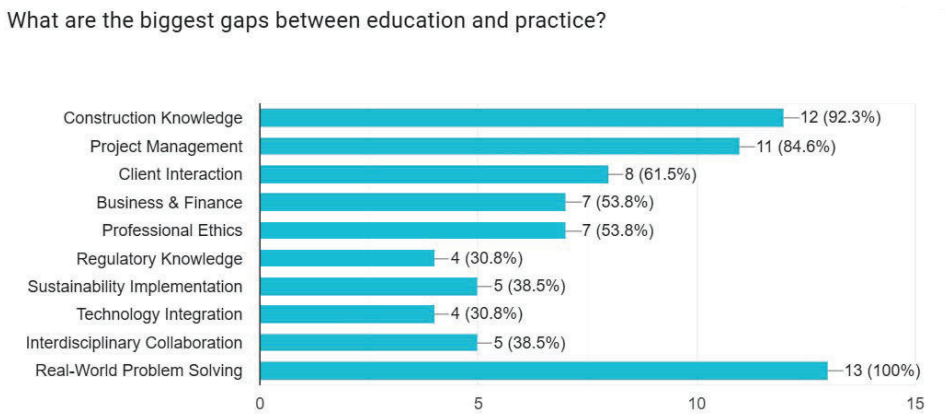
[13]Glass curtain wall systems were developed in Northern European and North American climates and represent a thermal liability when deployed without appropriate shading, orientation, or environmental management systems in sub-continental climates. Their adoption in Pakistani cities, driven primarily by aesthetic and status associations, represents a fundamental misalignment between building form and climate. See Khalid, W., & Sunikka-Blank, M. (2018). Disconnect between modern construction and vernacular wisdom in Pakistan. In Cruz-Ramírez, M. (Ed.), Resilient Communities in Pakistan.

For strategies to preserve cultural identity, material selection (92.3%), education and awareness (84.6%), contextual design (76.9%), and adaptive reuse (76.9%)[14]were most strongly endorsed. One respondent suggested a useful framework: treat global trends as vocabulary and local context as grammar, with climate, materials, spatial traditions, and cultural values as non-negotiables, however contemporary the expression. Another argued that architects need to actively champion contextual design, push for adaptive reuse over demolition, and start documenting vernacular traditions before they are lost entirely.

3.5 Theme 5: The Education-Practice Divide and the Future of Architectural Training

The fifth theme produced the most practically grounded and critically frank findings of the whole survey. Respondents consistently pointed to a significant structural gap between what architecture schools teach and what practice actually demands.[15]Looking back, respondents identified critical thinking (92.3%), Design Studio (69.2%), technical courses (61.5%), and presentation skills (61.5%) as the most valuable parts of their architectural education. One described the design thesis as the standout experience; it forced independent research, required taking a clear position, and demanded that decisions be defended. That framework, they said, applies to every project they have encountered since. Another pointed to the cultivation of design sensitivity and curiosity as the real foundation of everything that followed.

The biggest gaps between education and practice were clear: real-world problem solving (100%), construction knowledge (92.3%), and project management (84.6%). One respondent said studio culture prioritises concept over buildability, and that leaves graduates genuinely underprepared for day one of practice. Another described a stark gap between academia and real life, arguing that critical thinking only works when it is grounded in reality rather than exercised in classroom conversations. Several respondents also flagged the absence of client management, business literacy, cost estimation, and professional ethics as serious omissions in what curricula currently cover.

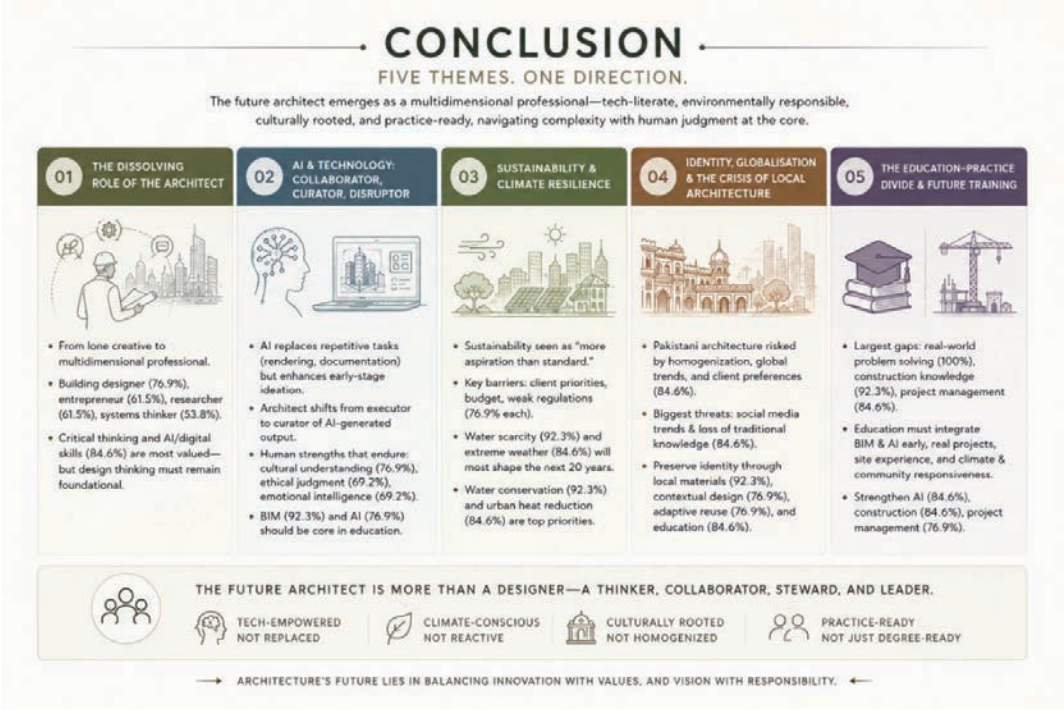


Visual record of a multiple-choice question from survey questionnaire

[14]Adaptive reuse refers to the practice of repurposing existing buildings for new uses rather than demolishing and rebuilding. It is widely endorsed as both an environmental strategy — avoiding embodied carbon expenditure in demolition and reconstruction — and a cultural one, preserving the material and spatial heritage of established built environments.

[15]Studio culture in architectural education refers to the pedagogical model in which design projects are developed within a shared, critique-based learning environment overseen by an academic tutor. While praised for cultivating conceptual ambition and peer learning, studio culture has been widely critiqued for its insulation from professional reality. See Nicol, D., & Pilling, S. (2000). Changing Architectural Education: Towards a New Professionalism. Spon Press.

When asked what one change they would make to architectural education, the answers clustered around a few things: mandatory BIM and AI integration from Year 2, live project experience and real site work, climate and community responsiveness embedded as principles rather than electives, and curricula updated to reflect international precedents, digital tools, and construction realities. One respondent made a bold suggestion: a mandatory two-year post-graduation requirement working in a registered firm before anyone is permitted to practice independently.[16]The areas most commonly flagged for strengthening were AI and Technology (84.6%), Construction Knowledge (84.6%), Project Management (76.9%), and Research Skills alongside Interdisciplinary Learning (both at 69.2%).



4. DISCUSSION

When these findings are placed in dialogue with broader global and regional scholarship, some significant and at times genuinely striking insights come through. What emerges is not simply a picture of a profession in transition but a field actively renegotiating its identity, its purpose, and its relationship with the wider world. The discussion below works through each thematic cluster, connecting what participants said to the underlying structural conditions and the trajectories most likely to define architectural practice over the next twenty years.

[16]The concept of a mandatory post-graduation work requirement, comparable to internship structures in medicine and law, has been discussed in several national architectural regulatory contexts as a mechanism for closing the education-practice gap. It remains, however, a contested proposal within the profession, with debates around mentorship quality, remuneration, and gatekeeping.

The Architect as Polymath: A Role Under Reconstruction

The near-universal sense among respondents that the architect's role has expanded dramatically since graduation is not merely a personal impression; it points to a structural shift in the profession. Global scholarship on architectural practice has tracked the emergence of what some theorists call the expanded field of architecture, a territory where the architect functions simultaneously as designer, urban strategist, environmental consultant, and digital technologist. This study confirms that this expansion is not a theoretical future; it is a lived professional reality for practitioners in Pakistan, even in a market far less formalised than those in Europe or North America.

But the data also surfaces a real internal contradiction. Respondents simultaneously identify the future architect as building designer, entrepreneur, researcher, systems thinker, and environmental mediator, yet the qualitative responses make clear that the profession's value systems and reward structures have not kept pace with this expanded scope. One respondent put it plainly: the architect's importance is much more than what is perceived, but it is not well acknowledged and certainly not well rewarded.[17]That gap between professional expectation and professional compensation is one of the most significant structural vulnerabilities facing architecture right now, particularly in Pakistan, where underpayment and undervaluation of architects is an acknowledged and persistent problem. If the profession keeps taking on more responsibility without a corresponding increase in recognition, authority, and remuneration, it risks becoming a field defined by excess obligation and diminished prestige.

AI and the Curator Thesis: The Most Consequential Shift in Architectural Thinking

The most intellectually rich part of this research is what it reveals about the relationship between architectural intelligence and artificial intelligence. The findings point toward an emerging framework that redefines the architect: not as maker or renderer, but as curator, someone who exercises critical judgement over a vast landscape of AI-generated possibilities.[18] That shift is profound. It does not simply add a new tool to the architect's kit; it reconfigures what design authorship actually means. If the architect's primary intellectual contribution moves from generating ideas to selecting and evaluating AI-generated options, then the criteria by which education, practice, and value are judged need to be reimagined accordingly.

The curator thesis carries an important implication: the human capacities that cannot be replaced are those that sit on either side of the act of generation, framing problems, contextualising them, calibrating decisions ethically, and grounding them in human experience. The research backs this up: cultural understanding, ethical decision-making, and emotional intelligence were consistently identified as the abilities least susceptible to AI replacement. And here is what makes that finding particularly striking: these are precisely the capacities hardest to teach, assess, or standardise within formal education, and yet according to the practitioners surveyed they are the capacities on which the future of the profession rests.

The finding that 100% of respondents identified Research and Data Collection as an area where AI can significantly help, compared to only 15.4% for Client Communication, reveals something important about AI's actual role: highly effective in analytical and generative domains, but limited where

[17]The structural undervaluation of architects in the Pakistani built environment sector is a recurring concern in professional discourse. Low fee structures, prevalent undercutting, and the dominance of contractor-led procurement models reduce the architect's authority over both design outcomes and professional remuneration. This contrasts sharply with the expanded scope of responsibility that respondents in this study describe.

[18]For a full treatment of the 'architect as curator' framework in the context of generative AI, see Bernstein, P. (2022). Machine Learning: Architecture in the Age of Artificial Intelligence. RIBA Publishing. Bernstein argues that as AI assumes responsibility for generative tasks, the architect's primary intellectual contribution becomes the exercise of critical selection and ethical calibration over AI-generated options.

relationships, trust, and contextual sensitivity matter.[19]That has direct implications for how AI integration should be structured in both practice and education. Not as a substitute for human judgement, but as an accelerant for the analytical and representational phases that lead up to it.

Climate and the Architecture of Necessity: From Ethics to Survival

The sustainability findings are probably the most sobering in the whole study. What they show is not a profession that is indifferent to climate but one that cares and yet is prevented from acting by structural forces largely outside its control. The convergence of client priorities, budget constraints, and weak regulation as the dominant barriers to sustainable design amounts to a systemic failure. It cannot be resolved through professional goodwill or better teaching alone. It requires a fundamental renegotiation of how sustainability is written into law, how it is incentivised by government, and how it is communicated as genuine value to clients.

That water scarcity (92.3%) and extreme weather events (84.6%) top the list of environmental challenges expected to shape architecture over the next twenty years is particularly significant given Pakistan's standing as one of the world's most climate-vulnerable countries. The respondents arguing that traditional building wisdom, vernacular techniques developed over centuries in direct response to local climate, may hold more answers than imported glass curtain walls are articulating something genuinely important: a recovery of indigenous architectural knowledge with profound implications for both professional identity and how we teach the discipline.[20]The future of sustainable architecture in Pakistan may need an archaeology before it can achieve a renaissance, recovering what has been discarded before genuinely new forms can be invented.[21]

The Identity Crisis: When Architecture Forgets Where It Lives

The findings on cultural identity amount to an extraordinarily candid professional self-critique. That 84.6% named social media trends as a primary threat to local architectural identity, and that client preferences (84.6%) ranked as the dominant influence on contemporary architectural identity, reveals a troubling dynamic. The visual economy of Instagram and Pinterest is shaping the built environment of Pakistani cities more powerfully than any professional body, planning authority, or school of architecture.[22]This is not simply an aesthetic problem. It is an ecological, climatic, and social emergency. Glass-clad buildings designed for visual impact and social media shareability are thermally catastrophic in a sub-continental climate, energetically wasteful in a country experiencing chronic energy crises, and culturally alienating in cities with deep and layered material histories.

The near-total endorsement of material selection (92.3%) as the primary strategy for preserving cultural identity is telling. Materials are not merely building components; they are repositories of

[19]The segmentation of AI capability — highly effective in analytical and generative domains, limited in relationship-based and contextually sensitive interactions — reflects empirical findings from multiple recent studies. Across practice sectors, AI has been found to outperform humans on data-intensive, pattern-recognition tasks while performing poorly on tasks requiring empathy, cultural interpretation, and embodied judgment.

[20]Jamil, M., Shahzad, K., & Mustafa, A. (2024). Paradigm Shift of Construction Techniques from Vernacular to Neo-Vernacular in Villages to Sustain Climate Change. Pakistan Social Sciences Review, 8(2), 68–81. This Pakistan-based study provides empirical support for the argument that vernacular construction techniques represent a repository of accumulated climate intelligence that modern practice has prematurely discarded.

[21]The concept of architectural 'archaeology' before 'renaissance' invokes the argument that sustainable futures must be preceded by a critical recovery and revaluation of discarded indigenous knowledge systems. This position has been developed in Dayaratne, R. (2018). Toward sustainable development: Lessons from vernacular settlements. Frontiers of Architectural Research, 10(3), 1016–1030.

[22]The relationship between social media-driven visual culture and architectural decision-making in developing markets is addressed in research on the 'Instagram effect' in architecture. Client preferences shaped by global visual platforms such as Instagram and Pinterest override climatic, contextual, and cultural considerations in the design brief, particularly in markets where architectural regulation is weak.

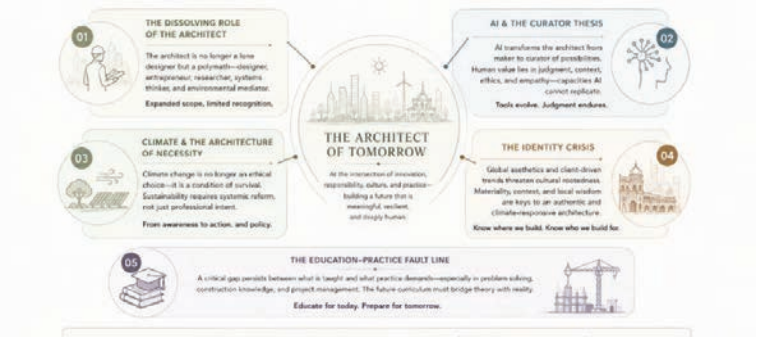
cultural memory, accumulated climate wisdom, and economic ecology.[23]Local brick, lime plaster, timber, and stone connect architecture to its landscape, its craftspeople, and its history. Moving toward imported, globally standardised materials severs those connections simultaneously at the aesthetic, ecological, and economic level. The future architect who understands materials as cultural agents rather than mere technical inputs will be far better equipped to resist the homogenising pressures of globalised construction.

The Education-Practice Fault Line: A Crisis of Preparation

The 100% consensus that real-world problem solving is the biggest gap between education and practice is the most statistically definitive finding in the entire survey, and it demands serious institutional attention. Architectural education, as currently structured, clearly succeeds in transmitting theoretical knowledge, critical capacity, and design thinking. What it fails to do is connect those capacities to the complex, messy, and often unglamorous realities of practice.[24]An architect who graduates with sophisticated conceptual frameworks but cannot read a full construction drawing set, negotiate a client contract, estimate a project budget, or navigate the regulatory environment of a Pakistani city is not yet a complete professional.

But the findings do not suggest abandoning conceptual and theoretical education in favour of vocational training. Critical thinking (92.3%) was identified as the most valuable aspect of architectural education, and several respondents directly credited their capacity for conceptual rigour with getting them through difficult professional situations. The message is not conceptual versus practical; it is that the two need deliberate bridges: live projects, embedded site work, professional mentorship during study, and studio briefs that reflect market realities rather than existing in institutional isolation.

The finding that 84.6% of respondents flagged both AI and Technology and Construction Knowledge as urgent priorities for architectural education is a striking convergence of the most futuristic and the most immediate professional needs. These two things sit at opposite ends of the technological spectrum, one pointing toward algorithmic futures and the other toward material fundamentals, yet both are equally absent and equally essential. Their simultaneous emergence as top priorities tells us something important: future architectural education needs to reach further into the digital horizon and deeper into the material ground at the same time.[25]



Concluding visual of discussion

[23]The use of local materials — brick, lime plaster, timber, stone — as a strategy for preserving both cultural identity and climate responsiveness is a well-established position in sustainable architecture scholarship. For Pakistan-specific material analysis, see: A Study of Eco-Friendly Sustainable Architecture of Pakistan: Designs and Materials. ResearchGate, 2025.

[24]For comparative data on the education-practice gap in a regionally proximate context, see: Connecting the Gap between Architectural Education and Practice in Egypt. ResearchGate, 2025. This mixed-methods study of 130 participants found 65% reported critical competency gaps, with only 28% of programs successfully integrating BIM — a pattern consistent with the Pakistani findings reported here.

[25]The concept of 'market-relative briefs' in architectural education — studio projects designed to reflect the regulatory, financial, and social realities of actual practice environments — has been advocated in recent pedagogical reform literature. See Salama, A.M., & Burton, L.O. (2022). Defying a legacy or an evolving process? A post-pandemic architectural design pedagogy. Proceedings of the Institution of Civil Engineers – Urban Design and Planning, 175(1), 5–21.

5. RECOMMENDATIONS

The findings highlight a shared responsibility between **architecture schools, professional practices, and policymakers** in readying the discipline for the challenges ahead. The key recommendations are summarised in the visual below, focusing on strengthening technological literacy, bridging the gap between education and practice, embedding sustainability as a standard expectation, and reinforcing cultural and regulatory support for the built environment.

Refer to the detailed visual on right for detailed insight.

6. CONCLUSION

This research set out to understand how practicing architects and architectural professionals in Pakistan picture the future of their discipline, and to surface the emerging challenges, opportunities, and transformations that will shape education and practice over the coming decades. The study has produced a layered, sometimes contradictory, and ultimately illuminating portrait of a profession at a genuine inflection point.

Five interconnected conclusions emerge, each with significant implications for the future of architectural education and practice in Pakistan and, more broadly, across the developing world.

First, the architect of the future is not simply a better-equipped version of the architect of the past. The profession is undergoing something more fundamental than an upgrade. The core of professional identity, what it actually means to be an architect, is being renegotiated. The future architect is a multidimensional professional: designer, strategist, researcher, and entrepreneur combined, using design thinking as the organising logic across a far wider range of contributions. Architecture schools need to prepare students for this expanded role not by abandoning design education, but by situating design thinking within a richer and more demanding professional context.

Second, AI is the single most consequential technological shift the profession has faced since the move from hand drafting to CAD, and it is moving significantly faster. The architect as curator model that emerged from this research offers a compelling and grounded framework for how human and artificial intelligence will co-evolve in practice. The key insight is that AI does not diminish the value of human judgement; it raises the stakes of it. As AI takes over the generative and representational phases of design, the quality of human decision-making, ethical calibration, and cultural intelligence becomes the primary differentiator of excellence. That has immediate implications for how architectural education approaches the development of judgement, not as an implicit by-product of studio culture, but as something explicitly and deliberately cultivated.

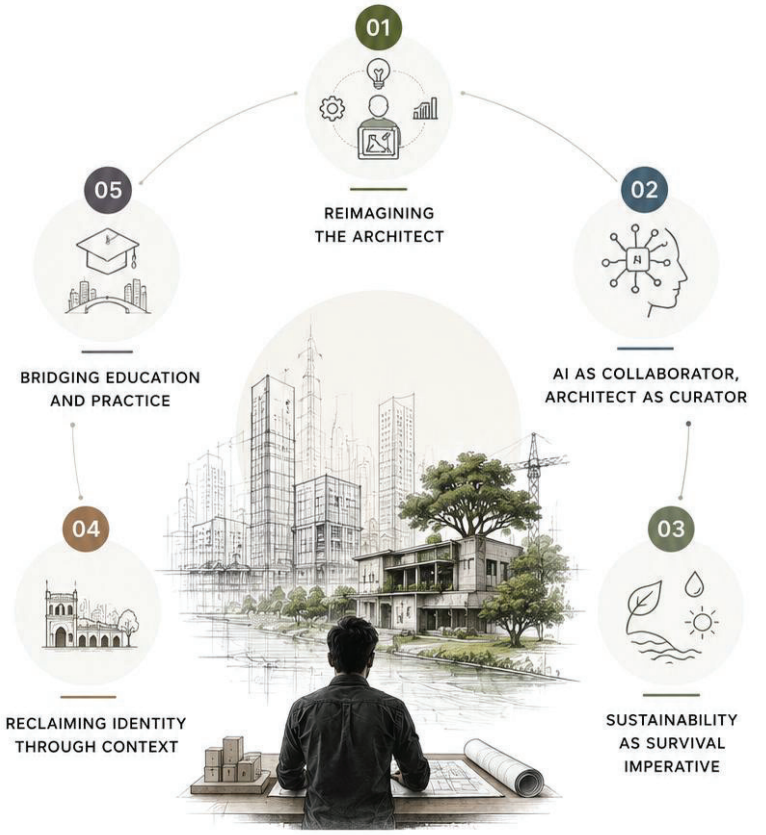
Third, sustainability in Pakistan is no longer an ethical aspiration or a specialist niche; it is a survival imperative. A country facing the convergence of water scarcity, extreme heat, urban flooding, and chronic energy deficits cannot afford a profession that treats environmental responsibility as a premium service for clients who can pay for it. The research is clear that the structural barriers to sustainable practice, inadequate regulation, client unawareness, and budget constraints, are real and formidable. Addressing them requires more than better-educated architects. It requires a broader ecosystem change: regulatory reform, professional advocacy, and building a genuine public and client understanding that sustainable design is not a luxury add-on but a basic condition of responsible building.

Fourth, the erosion of architectural identity is not only a cultural concern; it is a convergence of cultural, climatic, and ecological failures expressed in built form. When architecture turns away from local material knowledge, climate wisdom, and spatial tradition in favour of globally imported aesthetics filtered through social media, the result is buildings that are thermally inappropriate, culturally alienating, and ecologically wasteful all at once. Recovering architectural identity in Pakistan is therefore inseparable from recovering sustainable and climate-responsive practice. Vernacular traditions and indigenous material knowledge are not nostalgic retreats. They are repositories of climate intelligence accumulated over centuries, and they are urgently needed for the design challenges of the coming century.

Fifth, architectural education needs to close the gap between the world it describes and the world its graduates will actually work in. The unanimous identification of real-world problem-solving as the primary deficit of current education is a clear call for institutional reform. That does not mean abandoning intellectual rigour, critical depth, or design ambition; these are among the things that make the best architectural education genuinely valuable. It means anchoring those capacities in

material and professional reality through deliberate pedagogical design. The future curriculum of a school like RHSA at BNU needs to be simultaneously more conceptually ambitious and more practically grounded: more rigorous in its integration of AI, BIM, and climate-responsive design; more honest about the realities of Pakistani practice; and more deliberate in developing the human capacities of judgement, cultural intelligence, and ethical reasoning that AI simply cannot replicate.

Ultimately, what this research reveals is that the future of architecture is not a single predetermined path. It is a contested, uncertain, and deeply human terrain shaped by forces pulling in different directions: the emancipatory potential of AI against the irreplaceable depth of human cultural intelligence; the urgency of climate survival against the inertia of economic and regulatory systems; the pull of global aesthetics against the resistance of local identity; the conceptual ambition of architectural education against the hard pragmatics of professional practice. Navigating these tensions with rigour, creativity, and integrity is the defining challenge ahead. And this research suggests the profession is beginning, consciously, critically, and with real urgency, to rise to it.



7. REFERENCES

All references are formatted in APA 7th Edition.

Baocheng, H., Jamil, A., Bellaoulah, M., Mukhtar, A., & Kamdoum Clauvis, N. (2024). Impact of climate change on water scarcity in Pakistan: Implications for water management and policy. Journal of Water and Climate Change, 15(8), 3602–3623. https://doi.org/10.2166/wcc.2024.710

Bernstein, P. (2022). *Machine learning: Architecture in the age of artificial intelligence*. RIBA Publishing.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Cruz-Ramírez, M. (2022). Identification of adaptive strategies in vernacular architecture facing flood risk. In Sustainable Development and Planning XII. WIT Press.

Crutzen, P. J. (2002). Geology of mankind. Nature, 415, 23. https://doi.org/10.1038/415023a

Dayaratne, R. (2018). Toward sustainable development: Lessons from vernacular settlements. Frontiers of Architectural Research, 10(3), 1016–1030.

Eastman, C., Teicholz, P., Sacks, R., & Liston, K. (2011). BIM handbook: A guide to building information modeling for owners, managers, designers, engineers and contractors (2nd ed.). Wiley.

Garcia, A. (2018). Architectural tradition, identity and globalization: Reflections on the problem of the homogenization of the built environment. Estoa, 7(14), 179–201. https://doi.org/10.18537/est.v007.n014.a08

Golden, S. M. (2017). Mapping the expanding and fracturing field of architecture. Architecture and Culture, 5(1), 15–36. https://doi.org/10.1080/20507828.2017.1278560

Ishaque, W., Tanvir, R., & Mukhtar, M. (2022). Climate change and water crises in Pakistan: Implications on water quality and health risks. Journal of Environmental Public Health, 2022, 5484561. https://doi.org/10.1155/2022/5484561

Jamil, M., Shahzad, K., & Mustafa, A. (2024). Paradigm shift of construction techniques from vernacular to neo-vernacular in villages to sustain climate change. Pakistan Social Sciences Review, 8(2), 68–81.

Khalid, W., & Sunikka-Blank, M. (2018). A proliferation of concrete, glass, steel and brick masonry structures in Pakistan: A climatic and cultural disconnect. Buildings and Cities – Resilient Communities in Pakistan Commentary.

Leach, N. (2022). Architecture in the age of artificial intelligence: An introduction to AI for architects. Bloomsbury Visual Arts.

Nicol, D., & Pilling, S. (Eds.). (2000). Changing architectural education: Towards a new professionalism. Spon Press.

Salama, A. M., & Burton, L. O. (2022). Defying a legacy or an evolving process? A post-pandemic architectural design pedagogy. Proceedings of the Institution of Civil Engineers – Urban Design and Planning, 175(1), 5–21. https://doi.org/10.1680/jurdp.21.00050

Stevens, G. (1998). The favored circle: The social foundations of architectural distinction. MIT Press.

The Future of Architecture in Pakistan: Challenges, Transformations, and Emerging Directions

A Desk Research Study on Climate, Technology, Education and Architectural Practice

Authors:

Esha Amir
Hadiya Babar Chaudhry
Shanzay Bukhari
Sana Imran
Aisha Ahmad
Kabeer Ali Malik

Architectural Professional Practice

Razia Hasan School of Architecture
Beaconhouse National University, Lahore

Instructor: Ar. Muhammad Omar Farooq
Semester: Summer 2026

Table Of Contents

Summary

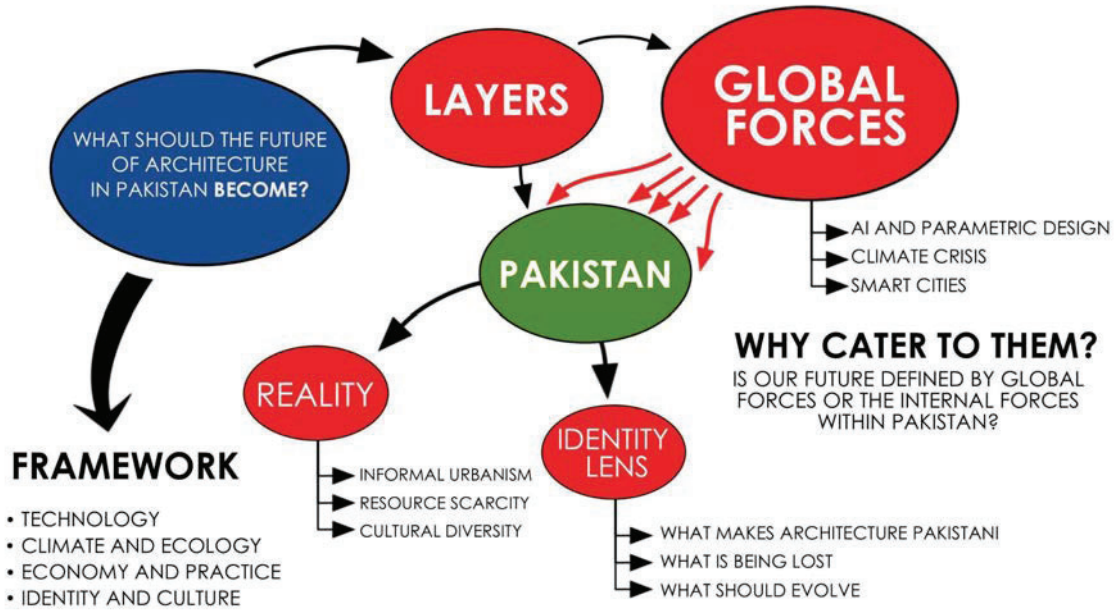
This research explores the future of architecture in Pakistan through the interconnected lenses of climate change, education, technological advancement, historical precedents, regional lessons from the subcontinent, and global architectural trends. By examining how environmental, social, and technological forces are reshaping the built environment, the study investigates how architectural practice, education, and professional responsibilities may evolve in the coming decades.

However, the future of architecture in Pakistan cannot be understood through the direct adoption of global architectural and technological trends. Rather, it must be viewed through the country's unique realities of climate vulnerability, rapid urbanization, informal development, resource constraints, and cultural diversity. While globalization offers access to new technologies, design methodologies, and sustainability frameworks, it also raises concerns regarding the erosion of local identity, craft traditions, and context-responsive design practices.

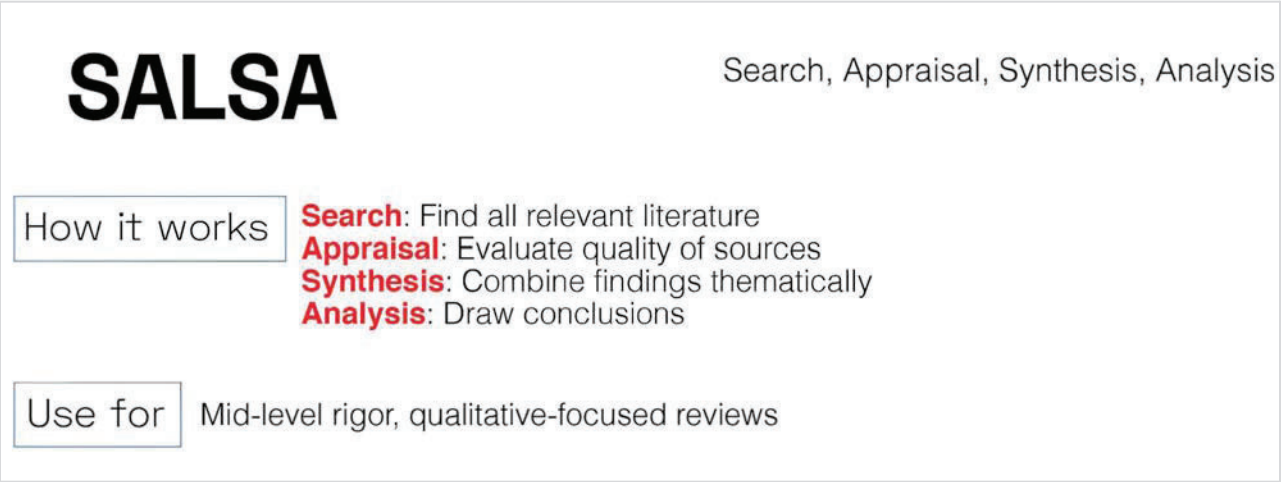
This raises a critical question: Do the global models often presented as the future of architecture adequately respond to Pakistan's environmental, social, and economic realities, or are they being adopted without sufficient consideration of local context?

Therefore, this research shifts the discussion from asking "What is the future of architecture?" to a more relevant and context-specific inquiry:

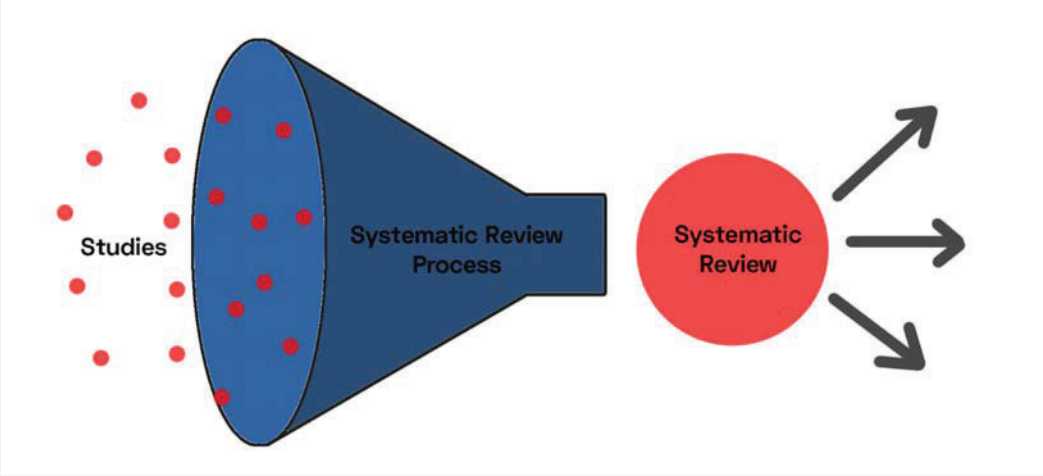
"What should the future of architecture in Pakistan become?"



Research Methodology



We will employ the **SALSA framework** (Search, Appraisal, Synthesis, Analysis) as the guiding methodological structure for conducting this desk-based research on the future of architecture in Pakistan. This framework provides a **clear, systematic progression** from broad data collection to critical interpretation, ensuring that the research remains structured, transparent, and academically rigorous throughout all stages of the study.



The Salsa Research Framework illustrated

In the *Search phase*, we will gather a wide range of relevant literature, including **peer-reviewed academic papers, institutional reports, policy documents, case studies, and professional publications**. This search will be conducted across **both global and local contexts**, ensuring that the research captures international architectural discourse as well as Pakistan-specific conditions. Particular attention will be given to core themes such as architectural education, climate change, artificial intelligence in design, urban development patterns, and regional comparative studies within South Asia.

Following this, the *Appraisal phase* will focus on **critically evaluating the collected sources**. Each piece of literature will be assessed based on its academic credibility, relevance to the research questions, methodological strength, and contextual applicability to Pakistan. Priority will be given to high-quality, peer-reviewed research and authoritative institutional publications, while less reliable or repetitive sources will be filtered out. This stage ensures that the research is built on a strong and trustworthy knowledge base.

In the *Synthesis stage*, the selected and validated information will be **organized and combined into coherent thematic clusters**. Instead of treating each source in isolation, findings will be grouped according to key themes such as technological transformation, climate responsiveness, pedagogical gaps, and global versus local architectural paradigms. This process will help identify patterns, relationships, and contradictions across different bodies of literature, allowing for a more integrated understanding of the subject.

Finally, in the *Analysis phase*, the synthesized themes will be **critically interpreted** to develop meaningful insights and arguments about the current condition and future trajectory of architecture in Pakistan. This stage will move beyond description to evaluation, helping to identify gaps in education, practice, and policy. The outcomes of this analysis will directly inform the conclusions of the research paper, particularly in terms of how architectural education, professional practice, and built environment strategies must evolve in response to technological, climatic, and socio-economic challenges.

Literature Review

Introduction

"The Future of Architecture," represents not just one prediction but rather a debated arena of assertions regarding how the field, its instruments, and its duties will evolve. This review examines the domain concerning the themes tackled in the current study which include the changing role of the architect, sustainability and climate, digital advancements, globalization and identity, education, as well as urbanization trends in order to identify existing knowledge and pinpoint areas lacking information. Throughout these threads, a consistent tension emerges: globally circulating models, technologies, and aesthetics on one hand, contrasted with the unique environmental, cultural, and economic realities of each location on the other. That tension shapes the review.

A beneficial perspective arises from expert foresight efforts, which depict the future of practice as influenced by a convergence of enduring forces such as climate change, technological advancements, the financialization of the built environment, migration, and evolving demographics (RIBA, 2024).

This review considers these forces as the context within which more specific literatures on climate-responsive design, digital technologies, regional identity, pedagogy, and urban growth are examined, with a particular focus on their relevance to Pakistan and the broader Global South

The Changing Role of the Architect

A wide range of literature argues that the architect's role is being redefined rather than simply expanded. Throughout history, the identity has repeatedly reformed around new technologies and social demands, from the Renaissance writings to industrial professionalisation, and anticipate further change under digitalisation and artificial intelligence. The profession might not completely disappear but it runs the risk of being dominated by non-architect specialists and technology.

This creates a paradox since it can be framed as a threat and an opportunity both. Where the architect is treated narrowly as a creator or early-stage designs, the role is exposed to competition from outside the profession and to automation; where it is understood as guardian of the whole built-environment process, it remains defensible and arguably more valuable (RIBA, 2024). For a context such as Pakistan, this debate matters because it bears directly on what graduates should be trained to do, a question taken up in the education literature below.

Climate & Sustainability

The literature covering the topic of climate increasingly organises itself around returning to vernacular and passive-design. Comparative studies and analysis showcases how vernacular architecture used in traditional building methods tends to be climate responsive via thermal mass, shading, courtyards, cross ventilation and orientation. This achieves comfort with minimal energy and local materials (D'amato & Kapoor, 2024). The general idea is that vernacular architecture is transferable and uses low carbon technology which is relevant

to contemporary design, therefore it should be used as a direct study and not just kept as a heritage to be preserved.

Studies show how methods of vernacular construction are being lost in developing countries since building sectors are pacing towards modernisation. In this race, traditional climate-responsive practice is being displaced and the idea of 'universal architecture' is being put on the top (vernacular design studies of Nepal and South Asia).

Technology: AI, BIM and Parametric Design

The literature available on technology can generally be divided into two sections of capability and adoption. On capability, reviews find that AI is reshaping core design tasks such as spatial planning, generative and parametric modelling and is converging with BIM, VR/AR and 3D Printing which is shifting the profession's value. (AI Systematic Review, 2025)

On adoption, the picture is much more cautious especially in the case of developing countries. Studies of BIM identify the same barrier of software and hardware cost, lack of specialised skill set, weak organisation and dependence on digital infrastructure which may be outdated. In places where most construction happens informally, without detailed plans or formal documentation, tools like BIM don't really fit, so they end up being used only on commercial or government projects. The takeaway is that new technology doesn't just automatically work everywhere; it needs to be adopted carefully, based on what infrastructure and resources are actually available.

Globalisation

The academic spine of the global-versus-local debate is *critical regionalism* which is the idea that architecture should use modern tools and methods while still being grounded in the specific place, climate, and culture it belongs to, rather than looking the same regardless of where it is built.

The concept emerged as a reaction to international modernism, which critics felt was producing buildings that could exist anywhere and were therefore rooted nowhere. Tzonis and Lefaivre (1981) first defined it, and Frampton (1983) developed it further, arguing for an architecture that resists globalisation by staying anchored in local conditions inclusive of climate, materials, light, and construction culture.

Later scholarship softened this into less of an opposition and more of a negotiation: how to selectively take what is useful from global practice without losing what is specific to a place (Lefaivre & Tzonis, 2003).

The central concern running through this literature is homogenisation which is the spread of a universal aesthetic that erodes regional character and, with it, climatic and cultural relevance. Scholars do caution that an exaggeration towards the local can tip into romanticised or superficial imagery therefore the argument is for intent and not for nostalgia.

Architectural Education & Pedagogy

The literature surrounding architectural education connects the themes of how architects are formed. Recent studies argue that the idea of studio-centered education was refined in the Global North and transported to the South without any or little regard for local social, ecological and cultural context (Harriss, Salama & González Lara, 2023).

There is a need for critical localisation which integrates vernacular and indigenous knowledge while also including precedents which fill the curriculum (Salama, 2023; Aschner Rosselli, Forero Parra & Sarmiento Jaramillo, 2025). Commentary specific to Pakistan raises the identity question directly, asking whether programmes prepare students for realities which are local or reproduce inherited Western models (Maqbool, 2026).

Urbanisation and Development

This strand focuses on architecture within the political economy of urban growth. Land in Pakistani and South Asian cities has moved from a resource to a commodity where growth is increasingly driven by private real-estate development. There has been a boom of large gated communities and "private cities" in which Bahria Town and Defence Housing Authority seem to be the most prominent.

The literature points out these areas more than just housing. They are instruments of land speculation and an ideological project mediating between the middle and upper class aspirations to modernity. It also contributes to urban fragmentation and displacement of existing communities. It places the future of architecture in between questions of land, capital and exclusion.

Synthesis and Research Gap

All of these literatures together share a pattern in which a global circulating model is imposed on local context without taking in consideration its own special needs.

Cluster	Representative Sources	Centrail Claim (Review)
The Future of the Profession	RIBA (2024); changing-role scholarship	Practice is being reshaped by a convergence of forces; climate, technology, and the financialisation of the built environment.
Climate	D'amato & Kapoor (2024); Nepal & South Asia vernacular studies	Vernacular passive-design wisdom is being displaced by a "universal architecture" that ignores local climate.
Technology	AI systematic review (2025); BIM-in-developing-contexts studies	Digital tools offer real gains but face cost, skills, and infrastructure barriers in developing economies.
Globalisation	Frampton (1983); Tzonis & Lefaivre (1981); Lefaivre & Tzonis (2003)	Critical regionalism resists homogenisation by mediating global modernity with local place, climate, and culture.
Education	Harriss, Salama & González Lara (2023); Maqbool (2026)	A Northern studio canon was transposed onto the Global South with limited adaptation to local context.
Urbanisation in Pakistan	Bahria Town case study (2018); dispossession scholarship	Growth is increasingly real-estate-driven, producing gated enclaves, fragmentation, and displacement.

Literature Review Summary

There are two gaps which emerge. Firstly, the strands are well developed as individual entities but not integrated therefore all are acting in isolation whereas the future of architecture in a place like Pakistan is determined by the interaction of these forces.

Secondly, much of the most rigorous theory and empirical work is produced for other contexts; Pakistan-specific scholarship that connects these themes and tests global models against local environmental, social, and economic realities remains comparatively thin and often descriptive.

This study addresses both of these gaps. All the strands are taken into a context/local specific account while reframing the question of the future of architecture in Pakistan.

4.1 Historical Analysis: Architecture in Pakistan

Findings

This section aims to summarize the historical data gathered via desk research, presented in a diagrammatic format. Findings are organized chronologically (Table 4.1.1), then through a comparison shown in (Tables 4.1.2-4.1.3, Figure 4.1.1), reflecting the transition from a craft integrated and climate responsive built environment towards a scattered one being globally influenced.

Table 4.1.1

Timeline of Architectural Eras in Pakistan

Era	Dominant Influence	Key Materials / Techniques	Role of Builder
Pre-Colonial	Regional climate, religion, craft tradition	Brick, mud, stone, timber; jaalis, courtyards, badgir	Master craftsman / mistri (design = construction)
Colonial (c.1850–1947)	British imperial authority, Indo-Saracenic hybridity	Cast iron, fired brick at scale, glass; imported styles overlaid on local crafts	Separation begins: 'architect/engineer' vs craftsman
Post-Independence (1947–c.1980s)	National identity-building, international modernism	Reinforced concrete, modernist forms with Islamic motifs	Foreign + local architects collaborating on state projects
Globalised / Current (1990s–present)	Market-driven globalisation, developer-led housing	Glass, steel, aluminium cladding; standardised templates	Architect's role often reduced to service-provider within developer system

Note: *Compiled from sources on colonial Lahore/ Karachi architecture, post-independence national projects and developer driven housing trends.*

Table 4.1.2

Formal vs. Informal City: Comparative Characteristics

Characteristic	Formal / Developer-Led City	Informal City (Katchi Abadi)
Planning process	Top-down, master-planned by private developers	Incremental, resident-driven, organic growth
Material sourcing	Imported / industrial (glass, steel, aluminium)	Local / recycled materials, often self-built
Climate response	Mechanical (HVAC-dependent)	Often passive (informal adaptation to site conditions)
Decision-making	Developer → architect (service role) → buyer	Community / household-level decisions
Population share*	Minority of urban population (gated communities)	Significant share of urban population housed in Katchi Abadis (varies by city)

Note: *Sourced from studies on Lahore informal settlement*

Table 4.1.3

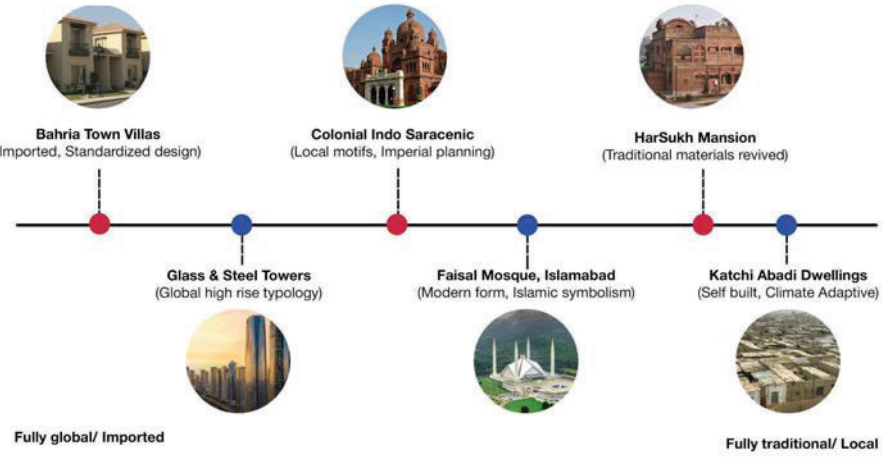
Survival of Historical Architectural Elements

Element	Status	Where Found Today
Passive cooling (courtyards, jaalis)	Largely lost in formal new-build	Older city cores, some heritage-conscious projects
Local materials (mud, brick, stone)	Survived in informal/rural construction; revived selectively	Katchi Abadis, rural housing, HarSukh Mansion-type projects
Craft ornamentation (jaalis, arches)	Survives as decorative reference only	Gated-community marketing aesthetics (steel/glass reinterpretations)
Master-builder knowledge system	Largely displaced by formal architect/engineer/developer system	Persists informally in self-built/Katchi Abadi construction

Note: *Synthesized from comparison on vernacular typologies, Mumtaz's HarSukh Mansion case study and informal settlement research*

Figure 4.1.1

Tension Map (Global vs. Local)



Note: *A summary map of the tension between 'fully global/ imported' to 'fully traditional/ local' in terms of architecture*

Discussion

This discussion traces how the historical trajectory of the architecture of Pakistan has formed the central tension framing this entire research, i.e., whether Pakistan's architectural future should be shaped by global models or practices or by its own climate, social and cultural realities.

4.1.a - From Craft Integrated Building to Industrial Standardization

The precolonial findings (Table 4.1.1, Table 4.1.3) show a built environment where design, climate response and craft were inseparable, a condition supported by vernacular typology (Sindh/ Baluchistan dwelling studies, Southern Punjab vernacular guidelines). This matters because it establishes that 'identity' in Pakistani architecture was never about decorative style; rather it was about an integrated system of material, climate and skill. The subsequent melting of this system, i.e., visible in Table 3, where passive design and craft survive only as bits and fragments that did not happen all at once but through ruptures from time to time.

4.1.b - The Colonial Rupture: Separating Design from Craft

The colonial era literature (on Indo Saracenic architecture in Lahore and Karachi) shows the first major institutional distinction between 'architect' and 'craftsman'. Studies including those of the works of Bhai Ram Singh illustrate how colonial administrators absorbed the local decorative vocabulary (the 'Jeypore Portfolio') while also repositioning the local craftsmen as the executors of designs defined by the foreign

rather than its originators. This finding is significant for the overall research as it shows us the first instance of 'global force' (in this case, imperial architectural policy) being layered onto Pakistan's building practice, i.e., a pattern that repeats in different forms through to the present.

4.1.c - Post-Independence Ambivalence: Modern Symbol vs. Local Substance

The post-independence findings reveal a paradox, i.e., newly independent Pakistan sought architectural symbols of sovereignty and modernity (Table 4.1.1), yet this was often achieved via foreign architects and internationally derived languages that were modernist (as documented in the literature on Doxiadis's Islamabad plan). This suggests that the 'global vs. local' tension identified in our research is not new, it was present at the very founding of the state's architectural identity, with 'modern' often functioning as a substitution for 'globally legible' rather than 'locally rooted'. This raises a question, has Pakistani architecture ever had a period where global and local were genuinely produced rather than dominating one or the other? The 'tropical architecture' literature on East Pakistan (1947-71) suggests at least one documented attempt at such a synthesis, which may be worth highlighting as an example of historical counter.

4.1.d - The Present: Two Disconnected Systems

Tables 4.1.1 and 4.1.2 show a split in the current built environment, i.e., developer driven formal housing (DHA, Bahria Town, etc.) and informal settlements (Katchi Abadis) with very limited architecture mediated space between each. Literature on informal settlement frames Katchi Abadis not as a temporary deviation but as the de facto dominant housing solution for a large share of the urban population, a finding complicating any narrative of 'progress' from informal to formal. Meanwhile, the import of global design vocabulary is seen increasingly in formal systems (smart homes, glass facades, gated typologies) with minimal attention or adaptation to climate or context. The point here is that both systems, in different methodology, work largely outside the kind of integrated design-craft-climate thinking identified as historically vital to Pakistani architectural self.

4.1.e - Identity as Practice, Not Ornament: The Mumtaz Counter-Example

Unlike the decorative reinterpretation of jaalis and arches common in marketing in developers, Mumtaz's approach aims to revive the pre colonial logic, treating materials that are local as well as craft as structurally as well as climatically functional, not just symbolic. This is significant because the historical knowledge deemed as 'lost' is not irretrievable, it has just not simply been mainstreamed. This discussion can frame this as evidence that a 'hybrid' future is not purely of theory as sole precedents already exist but remain at a margin to the dominant developer driven model in built practice.

4.1.f - Synthesis: A Recurring Pattern, not a Single Event

The tension found between ‘global forces’ and ‘Pakistani realities’ from our research framework is not something newly created by Ai, parametric design or smart cities, rather it is the latest iteration of a pattern that has been visible since the colonial period. An external architectural framework (imperial, modernist, or now commercial in terms of being global) is being layered onto conditions of local nature with local identity persisting mainly through informal practice or isolated individual projects rather than being of the mainstream. This historical pattern is what positions the historical analysis of this research as foundational. The question to be asked is whether this repeating pattern will continue to repeat again with AI and smart city models or whether it can finally be broken.

4.2 **Comparative Regional Trajectories (Pakistan, India, Bangladesh)**

4.2a **Historical Roots & split trajectories**

The profession (Architecture) grew from the exact same soil in the sub continent, which was because of the British colonial education system. Following 1947 and 1971, Pakistan, India, and Bangladesh all inherited identical RIBA-based regulatory frameworks and they all faced the exact same question, **how do we define our identity post-independence?** They instantly split paths based on early national choices and went in their own trajectories (James-Chakraborty, 2013)." India jumped headfirst into global modernism with state backed mega projects, eg. Chandigarh. Bangladesh focused inward, working on a more low-cost mastery of raw, local materials. Meanwhile, Pakistan spent its early years struggling between importing sleek, Western imagery for its new capital, Islamabad, and leaning into nostalgic, localized historicism. This early divergence set the stage for the extremely different approach in the style and choice of Architecture we see today.

4.2b **Market Drivers and Current Landscape**

In current times, the three nations curate their buildings and architecture based on different economic factors.

India: India’s architectural economy runs on global tech capital, foreign investment, and massive "Smart City" initiatives, which has resulted in a hyper dense, high-tech corporate skyline.

Bangladesh: Bangladesh’s market is dictated by its geography. Operating as a fragile, shifting river delta, it has embraced a community centric architecture heavily funded by NGOs and climate adaptation grants, earning it global respect for sustainable regionalism. (James-Chakraborty, 2013).

Pakistan: Pakistan’s practice stands in stark contrast. It is almost entirely driven by real estate speculation, private developers, and massive sprawling, horizontal housing societies for the elite. Only very recently have we seen a top down push for a vertical business district, (CBD).

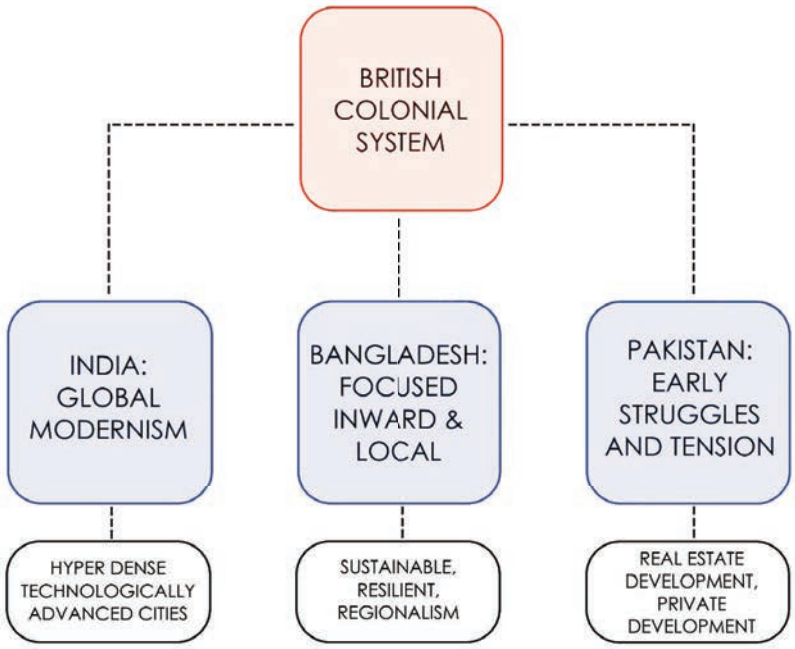


Figure 1: Comparative Diagram

4.2c **The Fallacy of Copying: Reality of Context vs Blind Adoption**

A very common assumption in Pakistan's local practice is that Pakistan is significantly 'behind' every other country, including its neighbours and Pakistan needs to 'copy' the high density glass and steel vertical buildings to catch up. This is a completely wrong approach as countries like India are backed by a booming IT driven infrastructure. Copy pasting such buildings in Pakistan would only create more problems as we are not catering to what needs to be catered (Al-Kodmany, 2018). Pakistan faces its distinct contextual challenges that require localized architectural solutions. Rather than blindly chasing foreign development models that address entirely different socio economic realities, our architectural direction must be rooted firmly in our own conditions. If we are to draw inspiration or adapt strategies from other countries, we should look toward neighbors who share our climate vulnerabilities, material constraints, and regional complexities. In this case, Bangladesh serves as a very good example. By analyzing how Bangladeshi architecture responds to its problems, Pakistan can find valuable, practical lessons for its own practice.

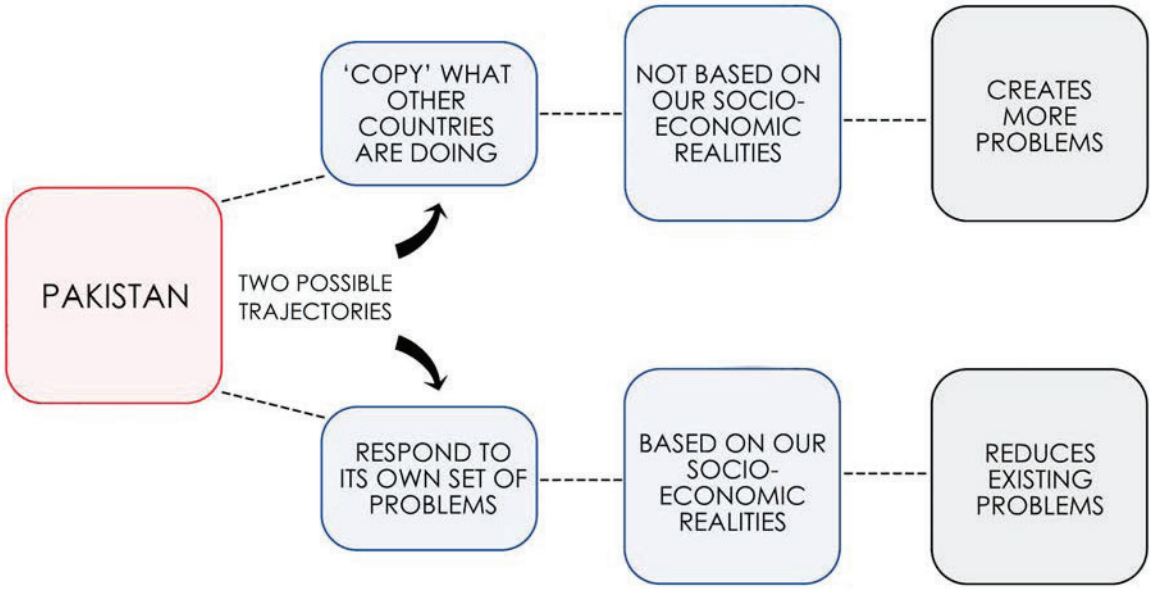


Figure 2 : Diagram showing the two possible trajectories for Pakistan

4.2d **Institutional Frameworks & Laws**

When we look at how the professional standards are enforced, the legislative gap between these three countries is a lot. . The Council of Architecture (COA) in India and the Institute of Architects Bangladesh (IAB) hold a very serious legislative weight, and are working hand in hand with their governments to dictate their urban policy. On the other hand, Pakistan Council of Architects and Town Planners (PCATP) is trapped in a structural bottleneck, leaving it playing defense rather than leading the conversation. Because Pakistan's regulations struggle to hold up ground against the incredibly powerful private developers, the architect is treated as an 'aesthetic decorator' who has been hired to decorate real estate plots, rather than a planner fighting for sustainable development and designing for the future of Pakistan.(Rana & Bhatti, 2018).

4.2e **Future Horizons: Where Are The Sub Continent's Practices Headed?**

India: Even though India is battling severe urban inequality and pollution etc, it is still moving towards fully automated mega developments and global corporate dominance.

Bangladesh: Bangladesh also has its own set of problems like climate, political unrest etc. But it is still leading the sub continent in terms of contextually well designed structures and initiatives.

Pakistan: Pakistan stands at an absolute crossroads. We can either chase unsustainable, high rise fantasy, or design for Pakistan.

The true future of Pakistani architecture will depend on a radical shift in our universities and firms. We must actively step away from our obsession with elite residential aesthetics and speculative real estate.

Pakistan does not need to copy the high-tech verticality of India, nor do we need to artificially adopt foreign typologies. Instead, we must build an architectural identity designed to solve our own crises. By shifting our focus from private luxury to the public realm, we can develop a hybrid model unique to Pakistan.

4.3 **Architectural Education in Pakistan**

4.3A Historical Roots of Architectural Education

Formal architectural training in the subcontinent is barely a century old and was assembled largely from imported parts. It began as a drafting course at the Mayo School of Arts (now National College of Arts) in Lahore in 1904 under colonial rule. After independence in 1947, the country did not have a dedicated and named architecture school and the few architects that did exist had received their training abroad. It wasn't until 1954 when the Government School of Architecture opened in 1954 at diploma level and the programmes that followed through 1960s to 1970s modelled themselves closely on the British and American studio systems. (Maqbool, 2026).

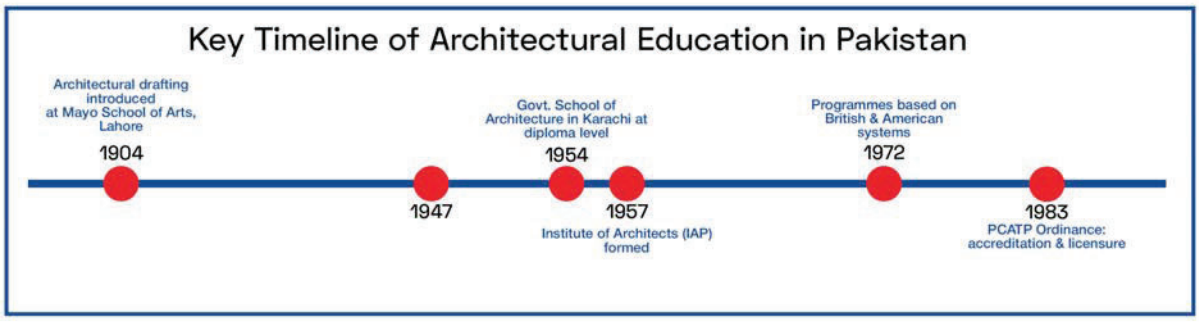


Figure 1. Key milestones in the development of architectural education in Pakistan (Sources: Maqbool (2026) and PCATP)

4.3B Global Trends in Pakistan's Architectural Education

The borrowed foundation from foreign sources was retained rather than re-examined and reinformed. The wider literature available describes how the studio-centered idea of the Global North was imposed onto the schools in the Global South and left nominal regard for the local context (Harriss, Salama & González Lara, 2023). The main concern is regarding how global knowledge in the field was taken as a default status in Pakistan rather than being a tested choice. Where adoption is critical, the predictable result is homogenisation which leads to graduates who are fluent in international design but not prepared for local conditions and realities.

4.3C Current Academic Practices and Curriculum

The profession is regulated by the body of Pakistan Council of Architects and Town Planners (PCATP) whose accreditation of the standard five-year Bachelor of Architecture is tied to the gain of practising license. Roughly thirty programmes are currently recognised by PCATP. Across these programmes, the curriculum retains the inherited studio structure which is organised into components including design studio, theory and history and technical/field-based learning with the design studio serving as the principal site of assessment. The dominant frame remains design-led and contains a tone of modernist ideologies rather than built through regional climate understanding or vernacular practices. (Maqbool, 2026)

4.3D Relevance of Global Pedagogies in Pakistan

The idea is not to completely reject global pedagogies and distance from the global standard but understand where it is needed, can be carefully integrated and learned from rather than import its assumptions. Some international standards do transfer well such as the shift in studio culture from individual authorship towards a collaborative and engaging place of work (Salama, 2018). However, what does not transfer well is a climate-blind package based on an aesthetic canon. Collaborative structures and tools can be localised but assumptions about context and style simply cannot be translated.

4.3E Reimagining Architectural Education in Pakistan

Architectural education in Pakistan needs to shift from producing employees to thinkers and innovators. The current programmes do not promote speculative and research-based thinking, rather prepare the students for the ‘market’ which ironically still leaves them underprepared due to lack of focus on local context. Therefore, critical localisation and radical thinking tools are to be implemented in order to see a growth in the field which doesn’t just add to a growing urbanisation problem of gated societies and real estate. There should be a focus on enrichment of the global knowledge with local realities (Salama, 2023; Aschner Rosselli, Forero Parra & Sarmiento Jaramillo, 2025). A reimagined curriculum would treat local concerns and use of materials as a marker of its core and frame digital and global tools as instruments to be used alongside it. Since accreditation is tied to licensure, the reform of PCATP standards is the most powerful lever for change.

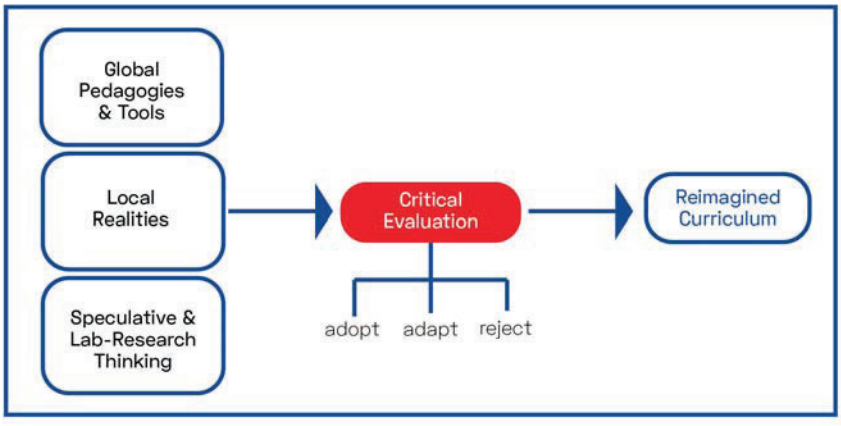


Figure 2. A framework for critical localisation of architectural education in Pakistan.

4.4 **Pakistan's Climate Trajectory**

4.4A Pakistan's Climate Trajectory: Past, Present and Future

Any inquiry into the future of architecture in Pakistan must begin with the fundamental reality it exists in. Pakistan stands on the most climatically volatile positions on Earth, it is wedged between the glaciated peaks of the Hindu Kush, Karakoram, and Himalayas in the north and the warm, rising waters of the Arabian Sea in the south. Therefore, Pakistan's climate trajectory is not just an environmental concern but a *fundamental condition* for the future.

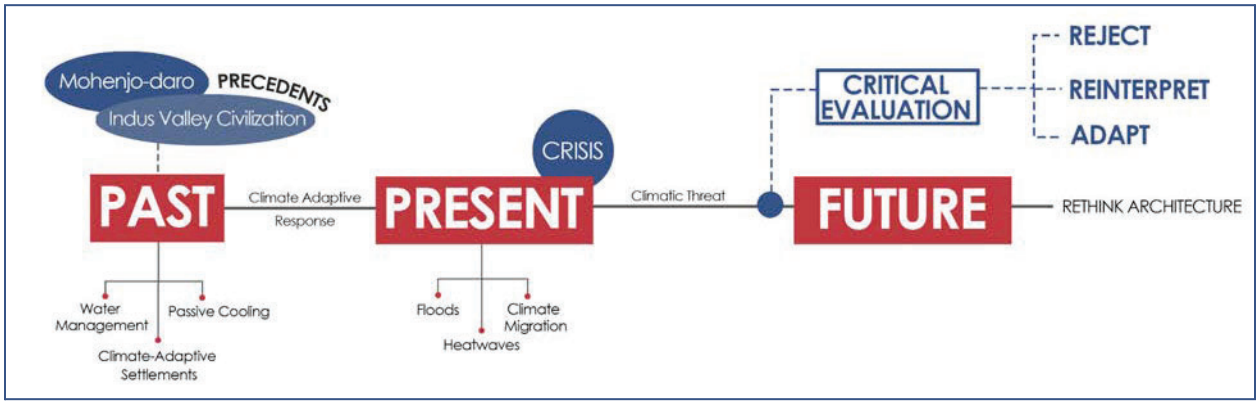


Figure 1. Mapping out the general climatic trajectory of Pakistan

Pakistan's Historical Climate: The Baseline

Paleoclimate research shows that the climate of the Indus region (Modern Pakistan) during the time of early civilizations like the Indus Valley Civilization and cities such as Mohenjo-daro was strongly shaped by the South Asian monsoon system (Staubwasser et al., 2003) . In response to this, the past societies developed adaptive strategies such as *bricked residences and refined water collection and disposal systems* that display a community closely aligned with seasonal patterns. Such a climate adaptive and context driven response is lost in our modern times.

The Present Crisis: Pakistan's Climate Vulnerability

Pakistan's ongoing climatic circumstances can be described by an accelerating vulnerability. The country has already faced *52 notable events* over the past twenty years (2002-2022) (Khan & Zahidi, 2024) with temperatures across Pakistan risen by approximately 0.5°C over the last 50 years at the national average, with some northern regions experiencing steeper increases (Asian Development Bank, 2017). This alarming condition is further emphasized by the reality that Pakistan possessed *the hottest urban areas globally for three years in a row* (Summer temperatures touching 53.7 degrees Celsius) (Khan & Zahidi, 2024).

Extreme climate events including floods, high temperatures, and lack of rainfall are now primary causes of *local migration*, forcing repeated relocation of vulnerable communities (IPCC, 2022; IDMC, 2023). Also,

despite having wide expanses of forest, Pakistan's deforestation rate is the *second highest in Asia*, after Afghanistan (Shahid, 2020).

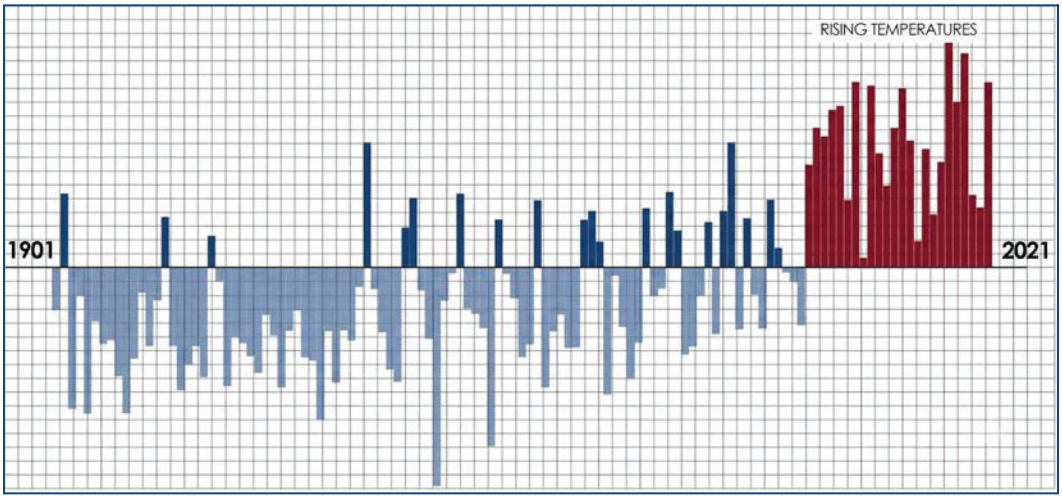


Figure 2. The chart shows warming in Pakistan over the past 120 years. Bars below the line showing cooler years and above showing warmer years. Source: Khan & Zahidi (2024, p.26).

Flooding is a major threat as seen by the incident in *2022* that engulfed a third of the country in water and took the lives of over 1,700 persons (Othering and Belonging Institute, 2023).

The above statistics and data show that this cycle is not episodic - *it is structural*.

Expected Future Projections

Pakistan's future climate is projected to become increasingly warmer and more unpredictable, with rising temperatures, more frequent heatwaves, intensified flooding, and prolonged drought periods.

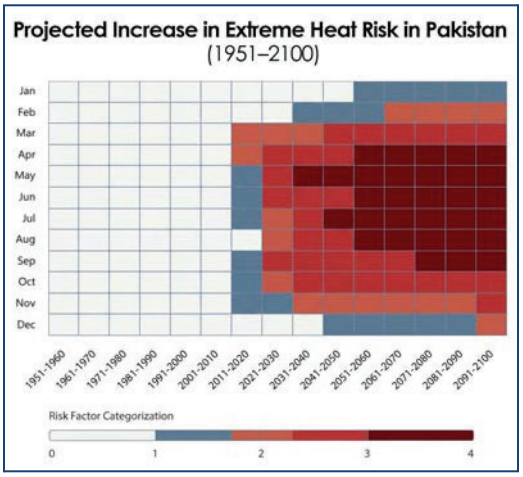


Figure 3. Chart shows projected heat risk in future.
Source: World Bank Group. (n.d.). Pakistan: Heat risk. Climate Change Knowledge Portal.
https://climateknowledgeportal.worldbank.org/country/pakistan/heat-risk

Therefore, it needs to be addressed while considering the future of architecture in Pakistan.

4.4B Comparative Analysis: Climate Adaptation in the West & Subcontinent

Western Approaches to Climate Adaptation

A defining feature of Western adaptation is that climate change is treated as a **permanent design parameter**. Since they have institutional strength and economic stability, they are able to invest heavily in climate-resilient infrastructure, strict building regulations, and long-term risk modeling as compared to Pakistan. Countries like the Netherlands have developed one of the world's most advanced flood management systems and New York has integrated climate resilience into post-disaster rebuilding after Hurricane Sandy, embedding flood risk into building codes and land-use planning.

Subcontinent (South Asia) Approaches

South Asia largely follows a **reactive adaptation model** responding after disasters occur given its economic constraints and gaps. Some notable steps taken by certain countries include light weight construction and flood-responsive settlement patterns, effectively "living with water" instead of resisting it in Dhaka, Bangladesh, Ahmedabad, India's introduction of South Asia's first Heat Action Plans and Kerala's community-led disaster response systems. Past approaches also show climate responsive strategies including India's stepwells and water architecture that water management was integrated into urban form.

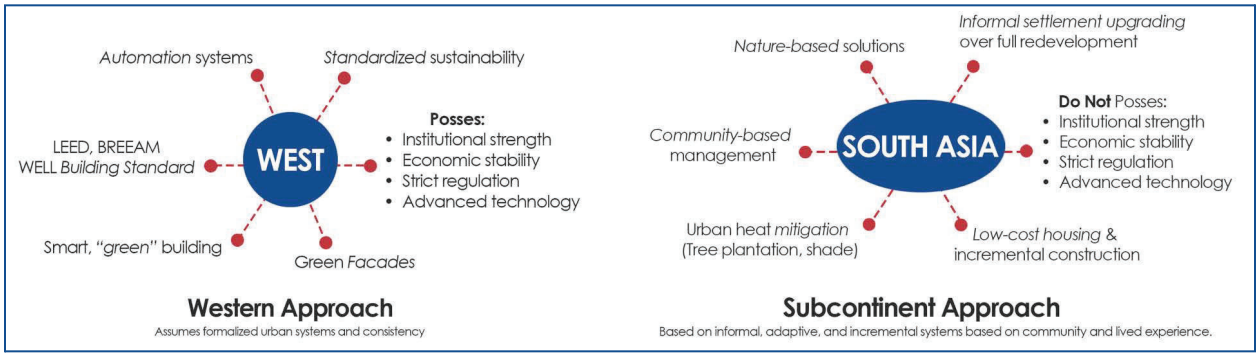


Figure 4. Comparison between western and subcontinent approach

Why Western Models Cannot Be Directly Applied to Pakistan

Western models depend on *economic stability, strong regulatory institutions and long term stability* which is lacking in Pakistan's reality. This is why Pakistan is not able to adopt the western models that assume *formalized urban systems and consistency*. Pakistan's climate system is dominated by extreme climate variability differing significantly from the temperate environments of many western cities.

4.4C Current Practice in Pakistan: Education, Practice, Policy, Governance

Despite the severity of Pakistan's climate crisis, its response to it remains critically underdeveloped.

- *Education in Pakistan:*

Pakistan's institutional response to its climate crisis remains disconnected with the scale of the threat. In architectural education, sustainability is treated *as an uneven addition* rather than a design principle (Maqbool, 2026). Equally absent from most architecture curricula is *training in the digital tools* that have become essential to climate-responsive practice. Students are not systematically taught Geographic Information Systems (GIS), which are critical for analysis, nor are they equipped with skills in data-driven technologies or AI-based predictive modelling. **The concern is not the use of AI to generate design but its application as an analytical and predictive instrument.**

- *The Pakistan Council of Architects and Town Planners (PCATP):*

The PCATP framework centres on design, technical, and professional skills *without mandating climate and computational environmental analysis skills* as requirements for licensure or academic curriculum (PCATP Accreditation Guide, 2022)

- *Architectural Practice:*

In practice, the construction industry continues to operate largely outside meaningful climate regulation. While Pakistan introduced the Energy Conservation Building Code (ECBC) in 2023, it is yet to gain adoption at the local government level (ECBC 2023 Analysis, StudyLib).

- *Pakistan Legislature:*

On the legislative front, the Pakistan Climate Change Act 2017 was created but it received little real power. The country's constitutional divide further exaggerated the gap as the federal government signs international climate agreements, but it is the provincial governments that are actually responsible for carrying them out on the ground (Courting the Law, 2018).

Pakistan has produced policy frameworks, signed international agreements, and introduced building codes but the gap between on-ground reality still remains. It does not lack awareness; it lacks enforcement, professional capacity, and the institutional coordination needed to respond to the crisis demands

4.4D Western Models for climate (LEED, Green Architecture)

LEED was developed by the *U.S. Green Building Council*. Globally, it has been criticised for lacking climate specificity, for prioritising certification points over actual energy conservation, and for failing to adequately address extreme weather conditions, exactly the conditions that define Pakistan's built environment challenge.

In Pakistan specifically, only a handful of LEED-certified buildings exist, and the system remains largely confined to high-end commercial developments in major cities. Pakistan did develop its own green building rating tool — known as **SEED (Sustainability in Energy and Environmental Development)** but research has shown that even this domestically produced tool was *built upon western standards and fails to address Pakistan's unique local context* (Khan et al., Buildings, MDPI, 2021).

Furthermore, LEED is far from Pakistan's *economic reality*: green certification processes require a lot of upfront costs that serve as a primary barrier. This renders it inaccessible to informal settlers and low-income communities that constitute a majority of Pakistan's urban population

The conclusion is clear: **western green architecture models are not adequately applicable to Pakistan's context.** They address a different climate, a different economy, and a different governance structure. Adopting them without fundamental adaptation risks producing what researchers have termed **"pseudo-green" architecture** (Buildings that carry the aesthetics and credentials of sustainability while failing to address the actual environmental, social, and climatic pressures Pakistan faces)

Conclusions

4.4E Future Horizons - Reimagining Architectural Futures for Climate Resilience in Pakistan

- *What Will the Architect Become?*

Future architects must move beyond designing buildings to understanding systems. They will act as facilitators, risk managers, and public advocates, integrating climate, water, infrastructure, and community needs to create resilient settlements rather than isolated architectural objects.

- *What Should Architecture Become?*

Future architecture must move beyond isolated buildings to become part of larger environmental and social systems. Public buildings such as schools, community centers, and public buildings should double as emergency shelters and relief centers, integrating water management, disaster response, and adaptable design strategies that strengthen resilience and support changing community needs.

- *What Should PCATP Do?*

PCATP must move beyond its traditional regulatory role and become a leader in climate-responsive practice. This includes establishing national climate design standards, integrating climate literacy and resilience into licensing requirements, mandating professional training in adaptation and disaster preparedness, and supporting research on local materials, passive cooling, and water-sensitive design strategies.

- *A Pakistani Alternative to LEED*

Pakistan Climate Resilience Rating System (PCRS) - A locally developed framework focused on Pakistan's climate realities rather than imported sustainability priorities.

Developed through collaboration between architects, planners, environmental scientists, policymakers, students, and communities, the system could evaluate projects based on flood resilience, rainwater harvesting, passive cooling, heat mitigation, local materials, community water storage, emergency preparedness, and climate adaptation. The point system would shift from measuring carbon alone to assessing a building's ability to withstand and adapt to environmental risks.

- *What Should Architectural Education Become?*

Architectural education should initiate design studio projects grounded in real-world conditions by engaging students directly with informal settlements, climate-vulnerable communities, and pressing social challenges while prioritizing design for marginalized populations through housing, resilience, adaptation, and community-led approaches. It should also emphasize valuing retrofit, repair, reuse, and adaptation over new construction, and encourage small-scale, incremental, low-cost, and flexible interventions supported by community-based site analysis methods such as interviews, surveys, participatory mapping, workshops, and long-term observation, alongside interdisciplinary learning that integrates climate science, GIS, hydrology, environmental planning, and public policy, ultimately framing architecture as a form of research where students are trained to carefully understand and define problems before proposing solutions.

- *What Should Practice Become?*

Architectural practice should prioritize evidence-based design, ensuring that all projects are grounded in environmental data, climate research, and post-occupancy evaluations to understand real-world performance, while embedding mandatory climate risk assessments that consider flood exposure, heat stress, water scarcity, and broader environmental vulnerabilities as core parts of the design process; it should also ensure meaningful community participation by involving stakeholders continuously throughout planning and design rather than treating them as post-decision consultants, while shifting focus toward retrofitting and upgrading existing cities and settlements instead of relying on unchecked expansion, and integrating “design with water” principles where drainage, stormwater management, and water storage are treated as fundamental infrastructure and spatial requirements rather than secondary technical concerns.

- *What Should Legislation Become?*

Building policy and planning frameworks should shift toward climate-based building codes that require flood adaptation, passive cooling, rainwater harvesting, and heat mitigation as standard design criteria, alongside strict enforcement of floodplain protection to prevent unsafe development in high-risk areas; governance systems should support decentralization by granting provincial or regional authorities greater autonomy to implement climate-responsive regulations tailored to local environmental conditions, while mandating comprehensive climate impact assessments for all major developments to ensure projects demonstrate clear strategies for managing climate risks before approval; at the same time, governments should incentivize adaptation through tax benefits and policy rewards for resilient design, adaptive reuse, passive cooling, and water-sensitive urban development, encouraging a proactive shift from risk creation to long-term environmental resilience.

4.5 Global Forces shaping the future of Architecture in Pakistan

Global forces are rapidly shaping how buildings and cities are being designed and constructed. Four major forces: **AI and Parametric design, Climate Crisis, Smart city and Automation, and Globalisation and Homegenisation**, are changing the architectural approach towards technology, materials, processes and urban form. The aim of this report is to analyze each of these forces, highlighting technical, social, economic, educational, policy and implementation dimensions, asking critical questions for how Pakistan can selectively adapt or challenge these trends in its own context.

4.5A AI & Parametric Design

The integration of artificial intelligence into architectural design has opened up many possibilities for the future of this field. **Generative** and **parametric algorithms** help architects in exploring vast design spaces and generating complex forms iteratively. **AI-powered design tools** can be used to break down large datasets of constraints to optimize **layouts, materials, and energy performance**. Apart from concept design, these tools have been integrated into the building lifecycle via **robotics, 3D printing and smart fabrication**, ensuring precision in the building of complex digital designs. Technically, firms are adopting **computational workflows** (parametric CAD, BIM+AI, generative design), and combining them with **digital fabrication** (robotics, CNC mills, 3D concrete printing). **Coding** and **data skills** have gained importance, both socially and educationally, and universities need to adapt their curricula accordingly. From an economic standpoint, the use of AI **reduces waste** and **speeds up projects**, but requires **upfront investments in software and hardware**. Policy-wise, questions of **liability** and **code compliance** arise: who is responsible when an AI-generated layout fails building regulations? This requires upskilling firms and coordination between designers, engineers and machine operators. The architecture community in Pakistan is met with many questions: How **accessible** are expensive AI and parametric tools to local practices, and can universities integrate them into teaching? Will these methods **complement** or **undermine** Pakistan's **rich craftsmanship traditions**? How to ensure that AI-driven design does not simply **reproduce "Western" aesthetics** disconnected from local context? These questions highlight the need to **adapt** AI and parametric innovation to uphold Pakistan's realities, ensuring technology empowers local architects and workers rather than sidelining them.

4.5B Climate Crisis

The climate crisis has called for **sustainability** and **resilience** to be made central to architecture. Globally, the conversation is shifting from merely reducing **carbon emissions**, to adapting buildings and cities for **extreme heat, floods, droughts and storms**. Climate-responsive design now means orienting and insulating buildings to save energy, and at the same time preparing them for climate stress (green roofs, depaving to absorb rainwater, flood barriers, etc.). This calls for a **holistic approach**: buildings are designed for **zero-carbon operation** and for **robustness**. From an **urban perspective**, the integration of stormwater management, expanded green infrastructure and flexible infrastructures are making the cities livable under climate stress. Technically, architects are using BIM-based simulations, performance-driven design, and smart building systems (sensors and control logic) to optimize resilience.

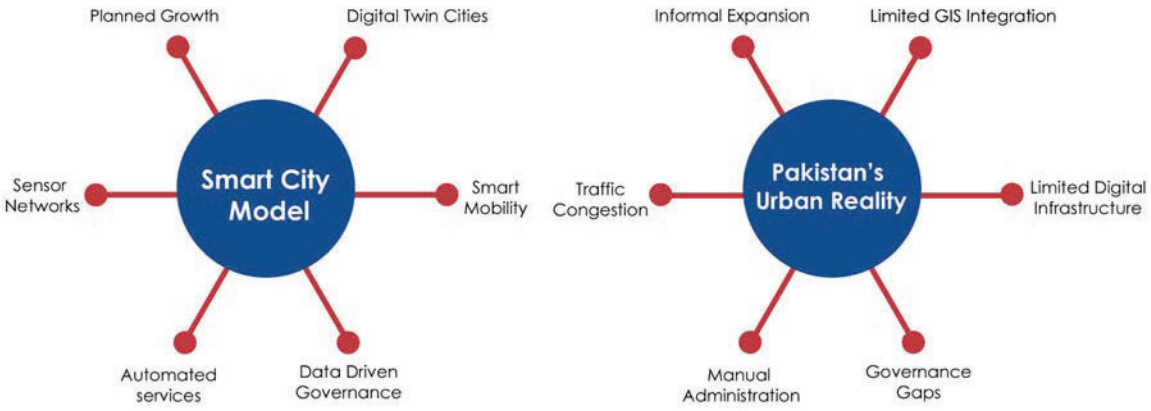
Socially, it is important to consider **community needs and equity**, like participatory planning that ensures poor or flood-prone communities benefit from the adaptive measures. Economically, resilient design can reduce long-term risks (e.g. avoid flood damage), however it is more expensive and requires new materials. Architects should be trained in **climate science** and **risk analysis**. Policies need changing, current prescriptive codes often ignore climate, whereas performance-based regulations (specifying resilience outcomes rather than methods) are emerging globally. Pakistan's vulnerability is this context is stark, with recent floods (mid 2022) affecting **33 million people** and damaging **2 million homes**. At this scale, it is important to **rethink local architecture** in context to the climate crisis and risk analysis. Fortunately, many traditional practices like raised bamboo or earth structures, small high windows and pitched roofs to shed water, already embody resilience. The challenge arises in integrating these with modern needs. The question arises: **How** can new buildings incorporate indigenous flood-proof designs and local materials rather than import generic concrete styles? Or Can architects lead in **shifting** from short-term, prescriptive planning to performance-driven, climate-informed codes that benefit even informal settlements? In order to address these, local knowledge must be **combined** with global best practices.

4.5C Smart Cities and Automation

The theory of '**smart cities**' uses ICT, IoT, and automation to ensure urban systems work efficiently and are sustainable. Cities worldwide deploy a dense network of **sensors, actuators and data platforms** for purposes like optimizing traffic flow, waste management, public safety and services etc. Buildings have become smart too: by incorporating **automated HVAC** and **lighting systems** controlled by occupancy and weather sensors, connected to city energy and transport networks.

Digital twins and AI analytics enable planners to foresee bottlenecks and model interventions. Robotics and prefabrication help in construction by boosting productivity. Automation reduces manual labour on repetitive tasks, improves maintenance, and personalizes user experience. Technical shifts include **mass data collection**, **cloud computing**, and advanced networks such as **5G/6G** underpinning citywide connectivity. Economically, smart city systems **reduce long-term operational costs** but require heavy capital and PPP models Socially, the use of such digital services risks excluding those without services or skills, and raises **security and privacy concerns**. Architects and city planners need to be educated about **data analysis, software tools and system integration**. Policy should be put in place addressing data governance, cybersecurity, and regulation of emerging tech (like drones or autonomous vehicles). Pakistan is now at the nascent smart city stage.

There is high mobile penetration (**≈180 million** cellular subscriptions, with **~95 million** 3G/4G subscribers), and investments in fiber-optic backbones and 5G trials. Islamabad has implemented **MetroBus** and **CCTV-based** "Safe City" systems, and Lahore is expanding the **Orange Metro train**. There are still many questions that need addressing, Can smart infrastructure be equitably extended beyond affluent enclaves to informal settlements that lack basic services? Will automation of traffic control or policing improve safety or disproportionately target marginalized groups?



Pakistan must ask whether to pursue imported smart-city models wholesale, or adapt them: perhaps focusing first on simple, high-impact steps while also training local engineers. The policy environment is still evolving, but Vision 2025 encourages digitalization, hence the emphasis on ICT hubs and AI centers is a positive signal. Ultimately, Pakistan needs to **ask**: Will embracing smart technologies really improve quality of life for all citizens, or deepen divides?

Figure 1. Comparative diagram illustrating the gap between global smart city models and Pakistan's urban conditions

4.5D Globalization and Homogenization

Globalization has spread architectural styles and practices worldwide, often at the expense of **local distinctiveness**. Cities worldwide are beginning to sport similar high-tech facades. Recent analyses suggest that doing so leads to "**urban homogenization**", where global styles and materials begin overshadowing local character, and prioritize standardized functionality over cultural identity. Historic neighbourhoods suffer when such renovation threatens to erase traditional textures. The result can be a built environment that feels **placeless**: changing location doesn't change the architecture, and "**context**"is neglected.

Technically, globalization means new materials and imported systems dominate even in climates they may not perform best. Economically, foreign investment and international contractors often finance big developments, pushing global design trends. However, this greatly devalues local building knowledge and craftsmanship.Education and practice may prioritize international styles over regional traditions.

Policies in many countries have not protected **vernacular architecture**, making it easier for developers to replicate global designs. In Pakistani cities we see these pressures vividly. Many new buildings uncritically adopt Western forms with little reference to local heritage. As one study notes, contemporary Pakistani

architecture often "**appears to have lost its cultural and regional identity**" under globalization. Many questions are asked such as: **How** to regulate "facadism" or insensitive upgrades that flatten the character of old city neighborhoods? Or Can urban planning support small-scale traditional builders and craftsmen so they're not pushed out by mass developers?

For instance, Pakistan has notable architects like **Kamil Khan Mumtaz** who intentionally synthesized historical forms, suggesting one path. But systemic change may require **policy**: heritage listing for monuments and even everyday urban fabric, education that instills pride in local styles, and planning frameworks that demand cultural relevance. Only by actively asking "**what is uniquely Pakistani about our architecture**?" can the country resist blanket homogenization and ensure global influences are **adapted**, not just adopted.

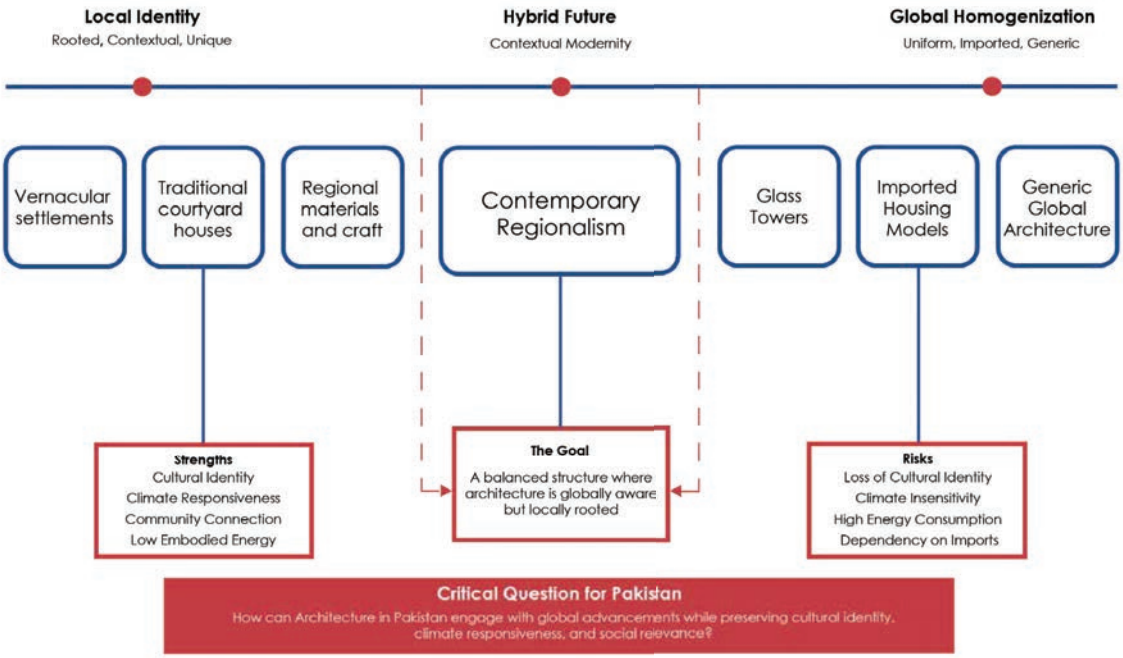


Figure 2. Globalization and Architectural Identity Spectrum

4.6 AI and the Future of Architecture: Practice and Academia

The impact of artificial intelligence on architecture is transforming the design methodology, the framework of the architect's professional practice and the educational landscape, all at once. This report explores these changes by engaging with desk research through academic literature, industry reports, policy documents and practice based case studies, focusing on the differences between the Global North and South Asian contexts.

Currently, 46% of architects are using AI tools, and the use is focused in the early design stages and by larger firms. This presents a paradox in the words AI can offer, 'democratization' and what it is

demonstrating, 'inequality'. The reality is not technological capacity, but who has it, and how they use it. The potential for the use of AI in architecture is not merely evaluated on the technical performance, but by taking into account political-economic aspects of access, regulation and professional identity that are yet to be determined and continue to be contested.

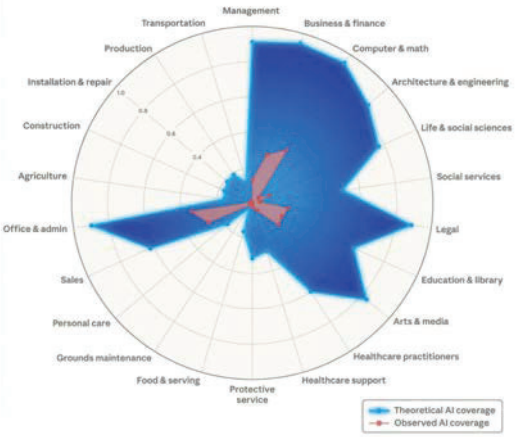
4.6A. Historical Examples

Looking back at previous architectural technologies, we notice a recurring theme: a phase of " democratisation" and " speed up" at the beginning followed by circularisation.When we reflect on the previous architectural technologies, each one of them shares a common trajectory of a " democratisation" and " speed up" phase at the start and a circular phase at the end.

And every architectural technology which has been introduced for the purpose of democratizing, accelerating (CAD, from the 80s-90s, BIM, 2000s, parametric, from the 10s), found itself in the same situation, early adopters who saw benefits in their quicker entry into the market and higher margins, tools which became requirements (and thus a cost) and a department or new category (and thus a number of specialists) within the institution, repeats or takes new processes from large well resourced firms and the benefits went to big, well financed companies, while a small practice had to compete on price. Both of these waves took about 15 to 20 years to come to the region of South Asia as a part of their Saturation, and were already well saturated when they arrived.

AI is not an exception, stratification will grow even more, the majority of jobs in the middle tier will become less, and jobs will become more geographically concentrated and based on size. History, however, has shown the profession changing and new professions emerging, the real issue and one that has been asked three times is whether access to these tools, access to education, and control by professionals, will continue about the same as they are now or will be revised accordingly.

4.6B. The Current State of AI



The application of AI in architecture is already happening, however the effects are recognized and not uniform. This led to the highest potential savings in early design phases like massing, facades optimization, site analysis, etc., where AI application translated to 15.8% reduction in construction costs, 21.2% reduction in energy consumption and 32% increase in energy modeling accuracy. The AI Generative market is growing rapidly and will increase by nearly four times by 2029.

Large companies are the most likely to adopt strategic AI due to the financial resources needed for training, licensing, and the risks involved. When it comes to the actual number of adopters, 60% of small practices are doing so but they are closing the gap in some negative ways. Geographically, 50% of adoption is in North America, 22% in Europe and South Asia is virtually unnoticeable. Other stories include the labour market where in the previous year alone 76,440 positions were lost, mostly in mid-tier documentation roles, resulting in a downward shift in learning trajectories from "junior" to "senior" architects.

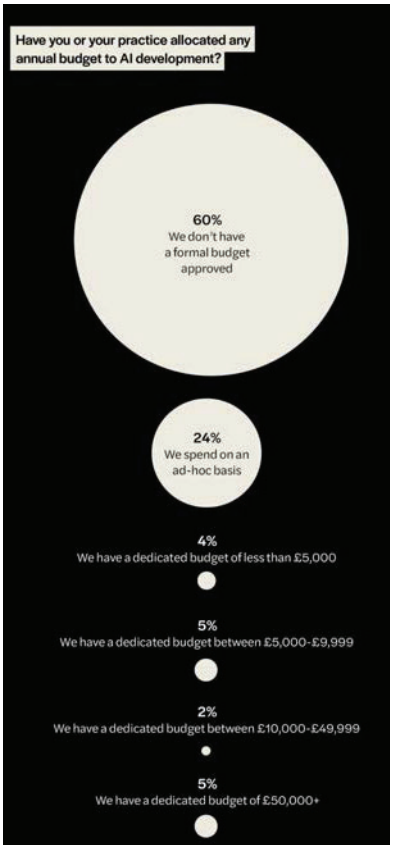
4.6C. Effects on South Asia

A new lens is needed to understand the situation in South Asia. The internet penetration in Pakistan is 21% and the fixed broadband penetration is 1.3%. The AI tools being sold around the world rely on connectivity to the cloud and computational infrastructures that are not present in the majority of the region.

But, there is an opposing argument. South Asia is not locked into CAD-heavy workflows. It could proceed straight to an AI-generated design that is context-aware and takes into account the conditions at hand, which include adaptation to extremes of climate in a nation that hit 53.9°C and 33 million people displaced to the countryside by flooding, and material efficiency under capital constraints. That's not wishful thinking, it's the fact that the opportunity to leapfrog is possible only by policy and investment. This is only a partial replica of the Global North trajectory, if you will.

4.6D. Integration in Academia

The field of architecture education also needs to evolve quickly, including the integration of computational design, coding literacy and AI ethics, along with studio design. There is some adoption of AI in schools, with leading institutions (Harvard, Columbia, Bartlett) embedding it into their design studios. But there is tension in that too, to teach a tool or critical literacy? Dedicated AI faculty and computational infrastructure is available at elite institutions, which is not the case for most schools. This implies the concept of 2-tier education skills: those from resourceful schools will be capable in the use of AI as a design partner and those from regional schools, AI is a 'plus'. The journey or process of curriculum reform is going in between the resistance of "remove" and "replace". In its non-redesigned form, integration with AI is a reinforcement of inequalities.



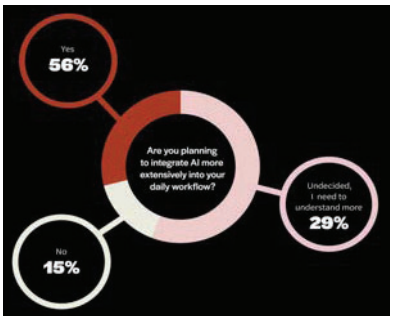


Figure 2. AI budget allocation survey
Figure 3. AI integration into workflow
Source: Architects' Journal, AI in practice: ChatGPT use far outstrips Midjourney, AJ survey shows.
https://www.architectsjournal.co.uk/news/ai-in-practice-chatgpt-use-far-outstrips-midjourney-aj-survey-shows

4.6E. Future Implications of AI

The "architect" eventually evolves into something more complex, such that, the “architect” will be followed by elite designers, now called ‘Design Curators’ who will be the ones judging the works of the AI and adding meaning to it. In parallel, practitioners in the middle tier become ‘Performance Engineers',

engineers who work on climate, energy and material efficiency. A new profession comes to light: the ‘Spatial Systems Strategist' who, among others, must orchestrate people, nature, and computations.

All this is not technologically determined. The future of AI depends on both public and private initiatives, on whether architect programs will include AI literacy, on regulation to protect the middle skills, and whether South Asia's AI environment will encourage local development or be a never-ending customer for AI tools. The technology sets environments. It's the individual's, institution and policy decision. It is these decisions that help to shape the future of the profession.

Conclusion

The intention of this research was to reframe itself to ask the question, what should be the future of architecture in Pakistan? not what the future of architecture will be. The answer that is proposed is not notional about global progress but not a "blind" acceptance of it after the historical journey and comparison to progress in other parts of the world, in educating the oppressed, overcoming nature, and navigating developments in technology. It requires something more strenuous, a way of building up an architectural identity which is truly Pakistani in its priorities, albeit utilising global tools and knowledge.

This tradition of the past has ensured that there is a longstanding antagonism between 'imported' frameworks and realities. It has been repeated in the times of colonial break up, post-independence ambivalence and today, the real estate regulation by developers.It was repeated when they were about to break apart in colonial times, when there was a lot of indecision in the post-Independence period, and when real estates are the luxury and luxury depends on the real estate developers. For all intents and purposes, the future, indeed, is a part of a continuum, one that Pakistani architecture has been unable to crack. It always happens again: There are tools to import, and then there is the local context. What happened last time, it was used to decorate.

This is further highlighted with the comparison done on a regional factor with India and Bangladesh. India should not and does not want to take the road that it has taken, the high tech, highly capitalist and internationally comprehensible language. It is dependent on economic and infrastructural circumstances which are not present here. More relevant is a paradigm that has been demonstrated in Bangladesh, a country that is as climate-exposed, material-scarce, and beset with economic problems as is Bangalore, and that had never turned to the Global North for enlightenment or training, but instead aimed to surmount the problems it faces without accepting anyone else's help. Well, it is at the crossroads and here Pakistan has not taken a step towards the right yet.

Indeed, the climate demands it more and more. Pakistan is one of the world's most climate change susceptible countries but still, climate is not part of the core of architectural education, and, at best, still not integrated into building codes. Climate remains a fringe of architectural education in its practice, applied somewhat loosely, sidestepped by legislation. Partly it's the institutional will, partly it's the capacity to enforce, but also it's part of professional responsibility. The proposed framework is for a Pakistan Climate Resilience Rating System that seeks to replace what the imported and sub-optimal LEED-type framework implies.

The basic transformation needs to begin in the education system. They are not serving the nation that they are training in, if they really could not understand the languages of the informal city, extreme climate, or material limitations, then it is an instruction designed by training designers who can command the most widely used international language. Changing to an AI tool in the original culture of the studio should not be merely of the type of 'bringing in the globally acquired knowledge of Pakistan', but of the notion of 'critical localization', integrating and comprehending the globally acquired knowledge into Pakistan's appropriated context. Accreditation is linked to the licensure process and thus has the most powerful weapon in its arsenal at its disposal that has not been leveraged in order to make this change.

None of this stuff is easy with the advent of Artificial Intelligence. Where not, it generally increases the disparities in current work, if not intensifies them, towards bigger business firms, and towards areas in the Global North. In the case of Pakistan, these core tenets of mainstream AI tools, such as connectivity to the cloud, computational power and built design systems, don't align with the realities of the way most architecture is realised. However, it is not impossible to leapfrog: a country without a prequel of legacy workflows can also have the opportunity to go straight to the AI-native, climate-conscious workflow more integrated with context, albeit the investments and policy that would make that more feasible may not yet be in place.

What this research ultimately finds is that Pakistan does not lack the historical knowledge, the regional precedents, the climate urgency, or the creative capacity to build an architecture that is genuinely its own. What it lacks is the institutional coordination to translate these into mainstream practice. Architectural schools don't need to be a place for employees, they need to produce thinkers. The practice should be changing from speculative real estate to managing public space. The laws need to be enforced not only put on paper.

The future of architecture in Pakistan will not be decided by the tools that become available. It will be decided by whether the profession chooses to use those tools in service of Pakistan's actual conditions, which are its climate, its informality, its craft traditions, its inequalities, its remarkable and underused intelligence, or whether it continues to import answers to questions that were never asked here. That choice remains open. However, this research argues that it cannot remain open for much longer.

Bibliography

Literature Review

Aschner Rosselli, J. P., Forero Parra, M.-A., & Sarmiento Jaramillo, A. (2025). Decolonizing creative education in the Global South. ScienceDirect. https://www.sciencedirect.com/science/article/pii/S0142694X25000286

Built houses as a tool to control residential land speculation: A case study of Bahria Town, Lahore. (2018). [Conference/journal paper]. ResearchGate. https://www.researchgate.net/publication/321385897

D'amato, L., & Kapoor, S. (2024). Climate responsive strategies in vernacular architecture: A comparative analysis at various latitudes. International Research Journal of Multidisciplinary Scope, 5(4), 1047–1068. https://doi.org/10.47857/irjms.2024.v05i04.01637

Frampton, K. (1983). Towards a critical regionalism: Six points for an architecture of resistance. In H. Foster (Ed.), The anti-aesthetic: Essays on postmodern culture (pp. 16–30). Bay Press.

Harriss, H., Salama, A. M., & González Lara, A. (Eds.). (2023). The Routledge companion to architectural pedagogies of the Global South. Routledge.

Lefaivre, L., & Tzonis, A. (2003). Critical regionalism: Architecture and identity in a globalized world. Prestel.

Maqbool, S. (2026). Climate, context and curriculum: A look at architecture education in Pakistan. Youlin Magazine. https://youlinmagazine.com/article/climate-context-and-curriculum-a-look-at-architecture-education-in-pakistan/MzI3MQ==

Pakistan Council of Architects and Town Planners. (1983). Pakistan Council of Architects and Town Planners Ordinance (IX of 1983). PCATP.

Royal Institute of British Architects. (2024). A skilled-up future: How skills, competences and roles in architecture must evolve (Future Business of Architecture / Horizons 2034). RIBA. https://www.riba.org/

Salama, A. M. (2018). From the Global South: Pedagogical encounters in architecture. Charrette (Special Issue).

Salama, A. M. (2023). Learning about and learning from: Enabling approaches for decolonizing architectural pedagogy in the Global South. In H. Harriss, A. M. Salama & A. González Lara (Eds.), The Routledge companion to architectural pedagogies of the Global South (pp. 24–33). Routledge.

The role of artificial intelligence (AI) in architectural design: A systematic review of emerging technologies and applications. (2025). Journal of Umm Al-Qura University for Engineering and Architecture. https://doi.org/10.1007/s43995-025-00186-1

Tzonis, A., & Lefaivre, L. (1981). The grid and the pathway: An introduction to the work of Dimitris and Suzana Antonakakis. Architecture in Greece, 15, 164–178.

UKFIET. (2025). How colonialism shaped modern education systems across India, Pakistan and Singapore. The Education and Development Forum. https://www.ukfiet.org/2025/

Chapter 4.1: Historical Analysis: Architecture in Pakistan

(Asif & Khokhar, 2024)

(Khalid, 2020)

(Bryant, 2020; Shuja & Junejo, 2020; Stone, 1988)

(Ahmed & Khan, 2024; Ar. Amitava Sarkar, 2011; Fresque-Baxter & Armitage, 2012; Karim, 2016; Khalid, 2020; Le Roux, 2003; Morshed, 2017; Paiva Henrique, 2013)

Chapter 4.2: Comparative Regional Trajectories (Pakistan, India, Bangladesh)

Al-Kodmany, K. (2018). The sustainability of tall building developments: A conceptual framework. Buildings, 8(1), 7. https://doi.org/10.3390/buildings8010007

James-Chakraborty, K. (2013). Louis Kahn in Ahmedabad and Dhaka. ABE Journal, (4). https://doi.org/10.4000/abe.3385

Rana, I. A., & Bhatti, S. S. (2018). Lahore, Pakistan – Urbanization challenges and opportunities. Cities, 72, 348–355. https://doi.org/10.1016/j.cities.2017.09.014

Rehman, A. U. (2014). Real estate business in Pakistan and its economic implications (MPRA Paper No. 44770). Munich Personal RePEc Archive.
https://mpra.ub.uni-muenchen.de/44770/1/MPRA_paper_44770.pdf

Riaz, H. (2018). Development or disparity: The case of Lahore, Pakistan [Student Project]. Due Parsons Methods 3.
https://due-parsons.github.io/methods3-fall2018/projects/development-or-disparity-the-case-of-lahore-pakistan/

Chapter 4.3: Pakistan's Architectural Education

Aschner Rosselli, J. P., Forero Parra, M.-A., & Sarmiento Jaramillo, A. (2025). Decolonizing creative education in the global south. *Design Studies*.
https://www.sciencedirect.com/science/article/pii/S0142694X25000286

Harriss, H., Salama, A. M., & González Lara, A. (Eds.). (2023). *The Routledge companion to architectural pedagogies of the global south*. Routledge.

Maqbool, S. (2026, April). Climate, context and curriculum: A look at architecture education in Pakistan. *Youlin Magazine*.
https://youlinmagazine.com/article/climate-context-and-curriculum-a-look-at-architecture-education-in-pakistan/MzI3MQ==

Pakistan Council of Architects and Town Planners. (1983). *Pakistan Council of Architects and Town Planners Ordinance (IX of 1983)*. PCATP.

Salama, A. M. (2018). From the global south: Pedagogical encounters in architecture. *Charrette* (Special Issue).

Salama, A. M. (2023). "Learning about" and "learning from": Enabling approaches for decolonizing architectural pedagogy in the global south. In H. Harriss, A. M. Salama, & A. González Lara (Eds.), *The Routledge companion to architectural pedagogies of the global south* (pp. 24–33). Routledge.

UKFIET. (2025, December). How colonialism shaped modern education systems across India, Pakistan and Singapore. *The Education and Development Forum*. https://www.ukfiet.org/2025/

Chapter 4.4: Pakistan's Climate Trajectory

Staubwasser, M., Sirocko, F., Grootes, P. M., & Segl, M. (2003). *Climate change at the 4.2 ka BP termination of the Indus Valley Civilization and Holocene South Asian monsoon variability*. Geophysical Research Letters, 30(8), 1425. https://doi.org/10.1029/2002GL016822

Khan, R. S., & Zahidi, F. (2024). Pakistan: On the front line of climate change. Centre for Excellence in Journalism, Institute of Business Administration (IBA). https://cej.iba.edu.pk/pdf/pakistan-on-the-front-line-climate-change-english-metadata-included.pdf

Asian Development Bank. (2017). *Climate change profile: Pakistan*. ReliefWeb. https://reliefweb.int/report/pakistan/climate-change-profile-pakistan

Intergovernmental Panel on Climate Change. (2022). *Climate change 2022: Impacts, adaptation and vulnerability* (AR6 Working Group II report). Cambridge University Press. https://www.ipcc.ch/report/ar6/wg2/

Internal Displacement Monitoring Centre. (2023). *Global report on internal displacement 2023*. Norwegian Refugee Council. https://www.internal-displacement.org/global-report/grid2023/

Shahid, J. (2020, August 15). *Pakistan's deforestation rate second highest in Asia: WWF*. Dawn. https://www.dawn.com/news/1574424

Othering & Belonging Institute. (2023). *Pakistan case study: Climate crisis, displacement, and the right to stay*. University of California, Berkeley. https://belonging.berkeley.edu/climatedisplacement/case-studies/pakistan

World Bank Group. (n.d.). *Pakistan: Heat risk*. Climate Change Knowledge Portal. https://climateknowledgeportal.worldbank.org/country/pakistan/heat-risk

Maqbool, S. (2026, April 1). *Climate, context and curriculum: A look at architecture education in Pakistan*. Youlin Magazine. https://www.youlinmagazine.com/article/climate-context-and-curriculum-a-look-at-architecture-education-in-pakistan/MzI3MQ%3D%3D

Pakistan Council of Architects and Town Planners. (2022). *Accreditation guide (updated March 2022)*. https://pcatp.org.pk/document/ACCREDITATION%20GUIDE%20UPDATED%20AS%20OF%20MARCH%2022%20V2.pdf

National Energy Efficiency and Conservation Authority. (2023). *Energy conservation building code 2023 (ECBC-2023)*. Government of Pakistan. https://studylib.net/doc/27745355/ecbc23

Hassan, A. (2018, November 19). Climate change legislation in Pakistan: A road to nowhere. Courting The Law. https://courtingthelaw.com/2018/11/19/commentary/climate-change-legislation-in-pakistan-a-road-to-nowhere/

Khan, M. A., Wang, C. C., & Lee, C. L. (2021). *A framework for developing green building rating tools based on Pakistan's local context*. **Buildings, 11**(5), 202. https://doi.org/10.3390/buildings11050202

Chapter 4.5: Global forces shaping the future of Architecture in Pakistan

Aksamija, A. (2021). *Integrating innovation in architecture: Design, methods and technology for progressive practice and research*. John Wiley & Sons.

Carpo, M. (2017). *The second digital turn: Design beyond intelligence*. MIT Press.

Kolarevic, B. (2003). *Architecture in the digital age: Design and manufacturing*. Taylor & Francis.

Leach, N. (2022). *Architecture in the age of artificial intelligence: An introduction to AI for architects*. Bloomsbury Publishing.

Mostafavi, M., & Doherty, G. (Eds.). (2016). *Ecological urbanism*. Harvard University Graduate School of Design.

RIBA. (2024). *Artificial intelligence: The unreliable outlier driving the future of architecture*. Royal Institute of British Architects. https://www.riba.org/work/insights-and-resources/future-business-of-architecture/artificial-intelligence-the-unreliable-outlier-driving-the-future-of-architecture/

United Nations. (2019). *World urbanization prospects 2018: Highlights*. United Nations Department of Economic and Social Affairs.

United Nations Environment Programme. (2023). *Building materials and the climate: Constructing a new future*. UNEP.

United Nations Human Settlements Programme (UN-Habitat). (2022). *World cities report 2022: Envisaging the future of cities*. UN-Habitat.

World Bank. (2023). *Climate and development report: Pakistan*. World Bank.

World Economic Forum. (2022). *Shaping the future of construction: A breakthrough in mindset and technology*. World Economic Forum.

Yeang, K. (1999). *The green skyscraper: The basis for designing sustainable intensive buildings*. Prestel.

Jencks, C. (2005). *The iconic building: The power of enigma*. Frances Lincoln.

Frampton, K. (1983). Towards a critical regionalism: Six points for an architecture of resistance. In H. Foster (Ed.), *The anti-aesthetic: Essays on postmodern culture* (pp. 16–30). Bay Press.

Tzonis, A., & Lefaivre, L. (2003). Critical regionalism: Architecture and identity in a globalized world. *Architecture and Urbanism, 37*(1), 22–27.

Renewable Energy Hub. (2024). *How architects are supporting the fight against climate change.* https://www.renewableenergyhub.co.uk/blog/how-architects-are-supporting-the-fight-against-climate-change

4.6: AI and the Future of Architecture: Practice and Academia

RIBA. (2024). AI in architectural education in the UK: Recommendations and insights. Royal Institute of British Architects.

RIBA. (2025). What can architects learn from an AI in education report? Royal Institute of British Architects.

Dreith, B. (2026, March 11). Architects and engineers among professions most automatable by AI according to Anthropic. *Dezeen*. Retrieved from https://www.dezeen.com/2026/03/11/architects-highly-expose-ai-anthropic-research/

Waite, R. (2025, October 3). AI in practice: ChatGPT use far outstrips Midjourney, AJ survey shows. *Architects' Journal*. Retrieved from https://www.architectsjournal.co.uk/news/ai-in-practice-chatgpt-use-far-outstrips-midjourney-aj-survey-shows

Autodesk. (2024). Generative AI for architecture: How architects use AI to explore design possibilities. Retrieved from https://www.autodesk.com/design-make/articles/generative-ai-for-architecture

OECD. (2025b). Evolving AI capabilities and the school curriculum: Emerging implications and case study on writing. Working paper.

OECD. (2025c). What should teachers teach and students learn in a future of powerful AI? Policy paper.

The Future of Architectural Education and Practice:

A Survey of International Architects and Practitioners

Rimsha Shafi, Shanzay Ashar, Ali Hammad, Anam Khan

Course: Professional Practice

Instructor: M Omar Farooq

Beaconhouse National University, Lahore

15th June, 2026

TABLE OF CONTENTS

ABSTRACT

The field of architecture is going through changes due to fast technological progress, environmental issues and changing societal needs. This research looks at how architecture will change with technologies, climate change and shifts in society. It explores how these changes affect what architects do and how they work. Architects roles and responsibilities are being shaped by these influences. The way they practice is also evolving. A review of existing research and surveys of architects from regions were conducted. The study found that architects think technology integration, sustainability working with experts and new skills are important. Technology, like AI and design software will play a role in architecture but use it as an assistant not a thinker. Sustainable design and climate-friendly buildings are becoming concerns. The study highlights the need for teamwork, adaptability and continuous learning. While, technology brings opportunities and creative solutions it also challenges what it means to be an architect. The relationship between architects and society is also changing. The research suggests that future architects will do more than design buildings. They will solve problems protect the environment and create spaces that meet people's needs. The study adds to the conversation about the future of architecture. Stresses the need, for architectural education and practice to keep up with a rapidly changing world.

Keywords: Architectural Practice, Future of Architecture, Emerging Technologies, Artificial Intelligence, Climate Change, Sustainability, Professional Transformation, Architectural Education.

MAPPING ARCHITECTURAL EDUCATION AND PRACTICE THROUGH VOICES

This research survey by Team SAAR explores how architectural practice and education are evolving globally, with a focus on emerging trends such as technology, sustainability, and changing professional roles. The study is conducted to collect information from a questionnaire that was given to practitioners who are currently working or have worked abroad. This questionnaire was structured in a way so that the study can see how architects think about the future of being an architect. The main goal of this study was to find out the gaps between what architects learn in university and what they actually do on the job. This will help prepare architects, especially in Pakistan by changing the way they learn and think about their job. The data will help conclude, to make architects aware of the things they really need to know.

PROBLEM STATEMENT

The reality of working as an architect today is very different. It involves a lot of automation working with data meeting tough environmental standards and dealing with uncertain economic conditions. This creates a problem in how architecture is taught. Many students who just graduate from university are good at making designs. They are not prepared to deal with the business side of things manage construction sites and understand the limitations of building in different contexts. In places like Pakistan this problem is even bigger. The systems for accrediting architecture schools are old-fashioned. The local economy works in a way that's different from the expensive Western models of design. These things do not match well with how architecture's taught. The result is that students are not well prepared for the reality of the job. They need to learn to design buildings that're not only good looking. Also practical and suitable, for their context. The architectural education needs to change to prepare students for

these challenges. It should focus on teaching students the skills they need to succeed in the world.

AIM AND OBJECTIVES OF THE STUDY

The main goal of this research project is to find out how architectural practice and education are changing around the world. This study wants to hear from architects in parts of the world to understand the problems with traditional architectural education. These problems will then be used to create plans for architectural education.

The study has four objectives:

1. What architects think about the future of their profession.
2. How technology and computer trends are redefining architectural education and design.
3. How architects use sustainability and climate resilience in their work.
4. To compare how architecture is practiced internationally with how it is done in Pakistan to see what changes are needed locally.

   The study is used for architectural practices with those in Pakistan to find out what adjustments are needed for Pakistan. This will help determine the changes needed for practice and education and the future implications in Pakistan.

LITERATURE REVIEW

The invasion of the architect's role shouldn't be seen as a threat but as a natural change that can be exploited – we must find our own new opportunities and education should shift to accommodate that." — Architect, Large Global Practice.

Technological forces, environmental factors and new modes of practice are driving profound change in the architectural profession. Many reports published by AIA (2024) and RIBA-Royal Institute of British Architectures (RIBA,2010) reveals that responsibilities of architects are expanding in to non-design nodes, interdisciplinary strategy and tech-driven approaches. Although published over a decade apart, both studies point to the architects have to reshape themselves with industry needs.

It would probably be something totally different so in ten years we probably wont call ourselves an architecture practice. – Architect, Smaller Urban Boutique Firm.

One of the most significant agents of change is technology. The AIA (2024) said larger practices in need of efficiency and better project management were already incorporating Artificial Intelligence into their processes, too. Likewise, RIBA (2010) anticipated this change by emphasizing that architectural education needs to shift away from focusing on traditional drawing techniques and include systems thinking,

Technology has emerged as one of the most influential drivers of change. The AIA (2024) reports that many firms are already integrating Artificial Intelligence into their daily workflows, particularly larger practices seeking greater efficiency and improved project management. Similarly, RIBA (2010) predicted this shift by arguing that architectural education must move beyond conventional drawing skills and incorporate systems thinking,

"I think we need to stop being overly polite and learn how to be business people." — Architect, Medium Sized Design-led Practice.

The same is true for structure and education of practice. According to AIA (2024), larger firms are becoming ever more dominant; RIBA (2010) suggested greater collaboration between architects and other specialists. Meanwhile, RIBA noticed a disconnect between what was taught

at academic level and how the profession operated, calling for less prescriptive and more transdisciplinary teaching. Likewise, Vosloo (2023) pointed out that advances in artificial intelligence, robotics, sensors, digital fabrication and advanced materials are reshaping how buildings are designed and built. The new materials, like carbon-reinforced concrete and recycled products, also signal an increasing intertwining of technology with environmental responsibility, he notes.

Entirely, these studies suggest that the digital turn is much more than just a change in the tools of architects. Technologies like AI, simulation and digital fabrication are transforming the design process itself and opening pathways for alternative ways of envisioning, constructing and understanding architecture. Consequently, current practice is very much data driven, multidisciplinary and digitally mediated

METHODOLOGY

This study used a mixed-method research linking quantitative and qualitative analysis to see the professional perspectives on the future of architecture.

SAMPLE AND PARTICIPANT DEMOGRAPHICS

The primary data for this study came from practicing architects and design professionals from around the world. A diverse global sample of N = 20.

Participants were selected using a purposive sampling strategy to ensure representation from both domestic and international contexts. The domestic context included the people who have worked abroad and are whether retired or serving in Pakistan. The respondent profile reveals that 45% (n = 9) of the sample consists of professionals in Pakistan who have international exposure.

The remaining 55% (n = 11) is divided globally: The United Kingdom represents 15% (n = 3), while the Middle East, North America (USA), and Australia/New Zealand represent an identical footprint of 10% (n = 2) each. The remaining 10% of the sample is between Europe (5%, n = 1) and other parts of Asia (5%, n = 1).

DATA COLLECTION

Data was collected digitally over a period of 4 weeks. We made a list of questions that people could answer. Some of the questions had set answers that people could choose from, a scale from one to five. Some questions were open so people could give their opinion. We got in touch with architects and designers across the globe by sending emails, and also through Instagram and LinkedIn.

DATA ANALYSIS

Quantitative survey metrics were analyzed using simple statistics. Qualitative responses, from the ended feedback fields were processed by grouping similar themes together. This approach helped the research team to classify text inputs into patterns, which form the basis of the findings below based on the survey metrics and the feedback fields. The research team looked at the survey metrics and the feedback fields to identify patterns.

RESULTS AND FINDINGS

The empirical data collected from the survey group (N = 20) reveals that the profession is going through a change and the world is trying to adapt it. The following sections outline the

demographic breakdown of the participants, analytical trends, and the qualitative themes extracted from the practitioners' open-ended statements.

PARTCIPANTS' DEMOGRAPHICS

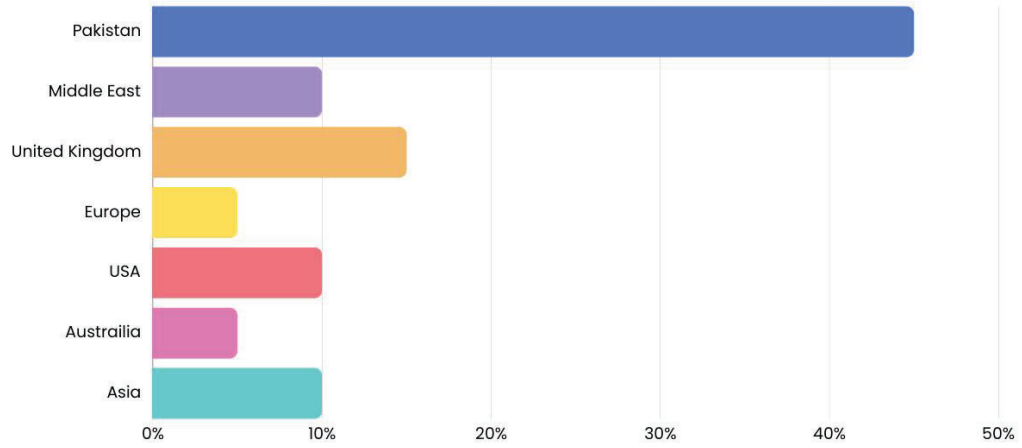


Figure. A total of 20 professionals responded to the survey regarding their current location of practice.

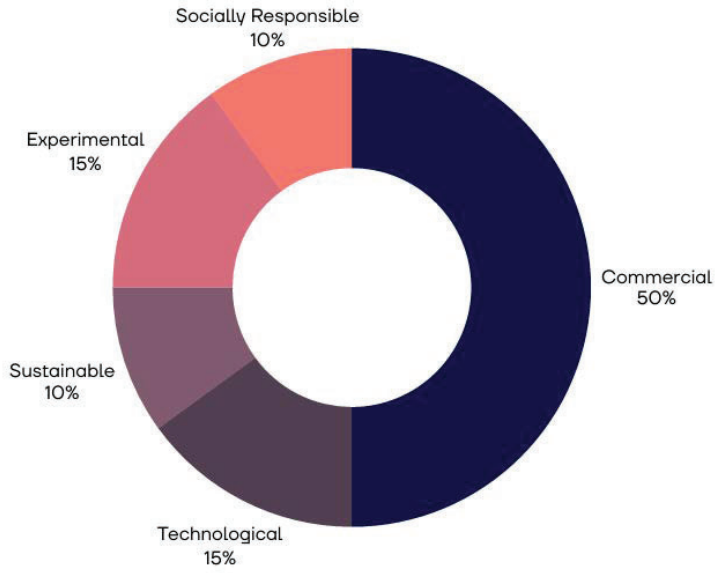


Figure. In your opinion, Architecture today is becoming more?

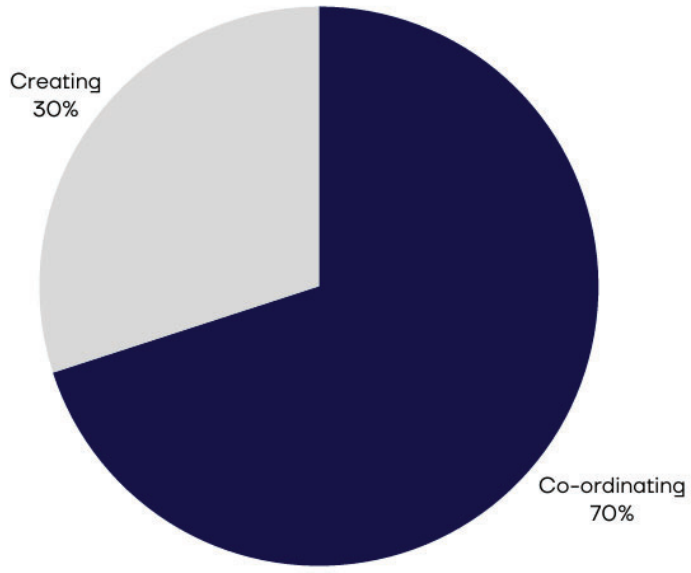


Figure. The Architect of Future will spend more time in?

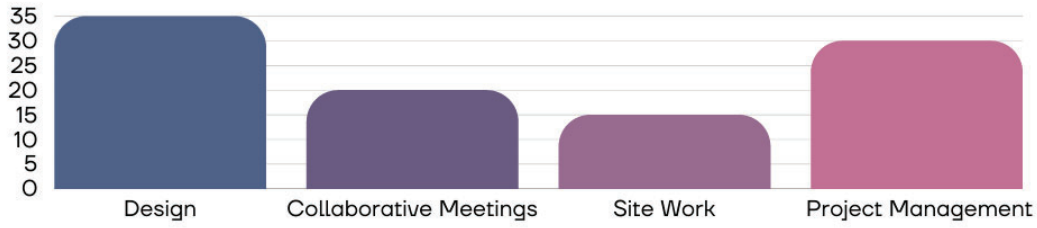


Figure. What occupies most of your working hours?

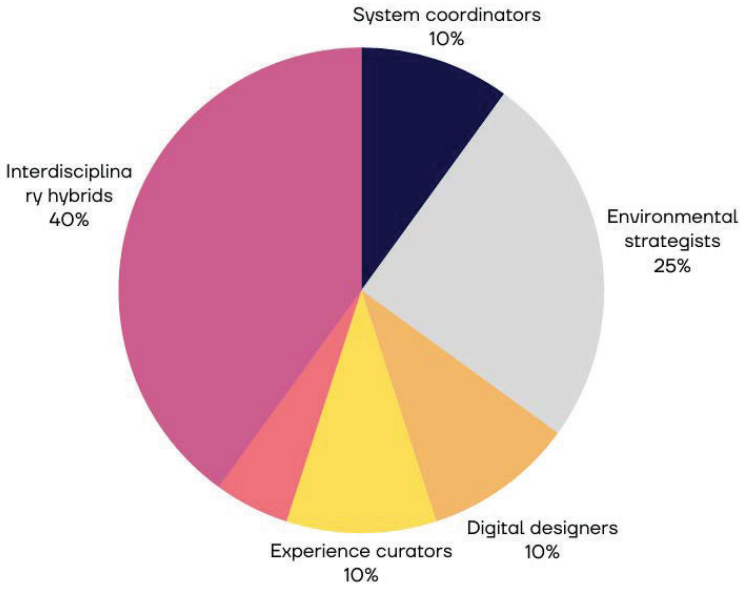


Figure. In the next 20 years, architects may become

Figure. Do you believe architects should play a greater role in policymaking?

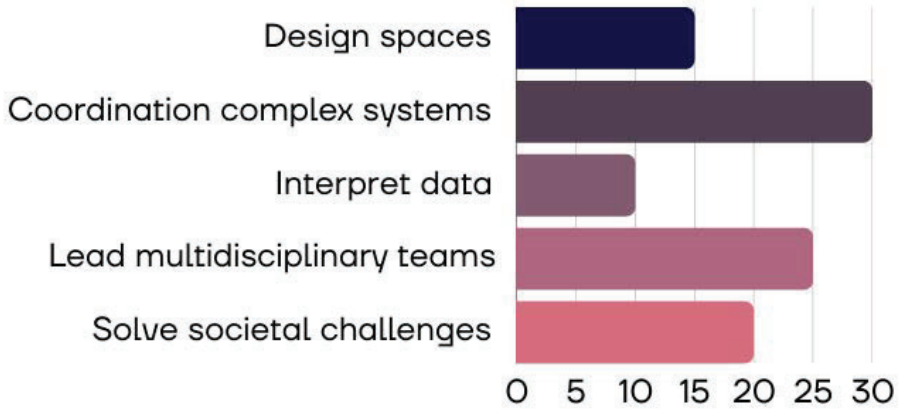


Figure. In coming years, architects will be valued most for their ability to

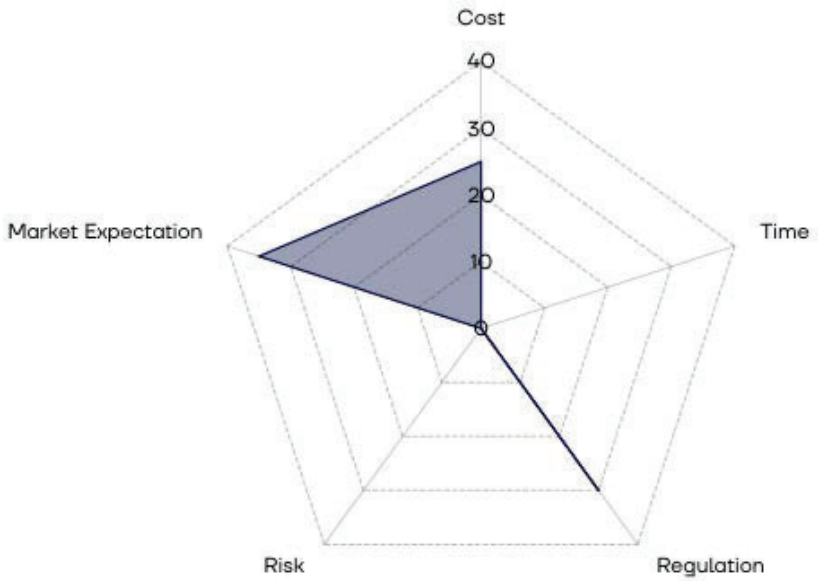


Figure. What most frequently limits architectural ambition?

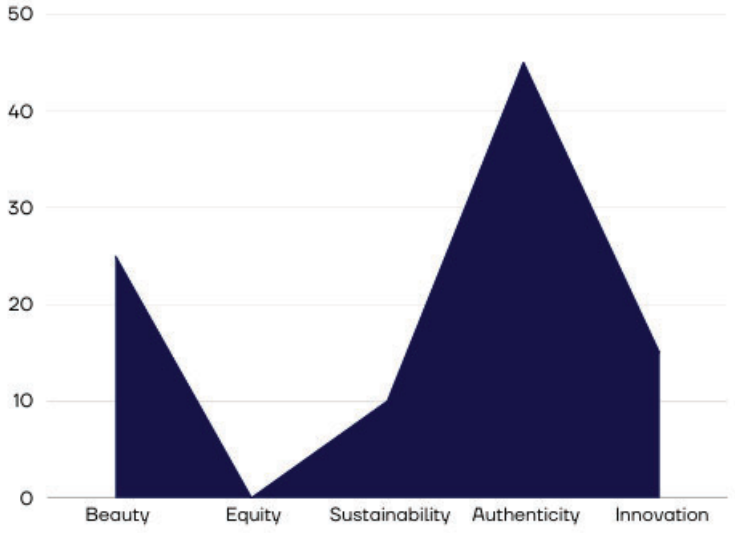


Figure. Which value is architecture most at risk of sacrificing

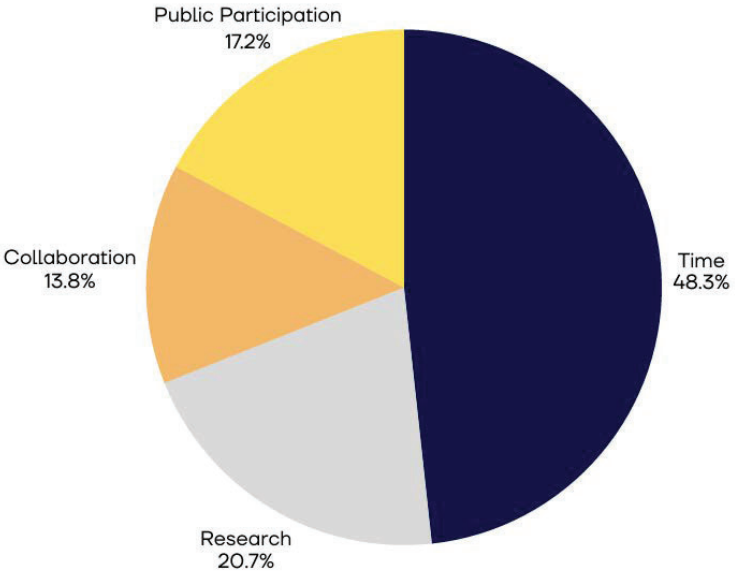


Figure. What is valued abroad more than in Pakistan?

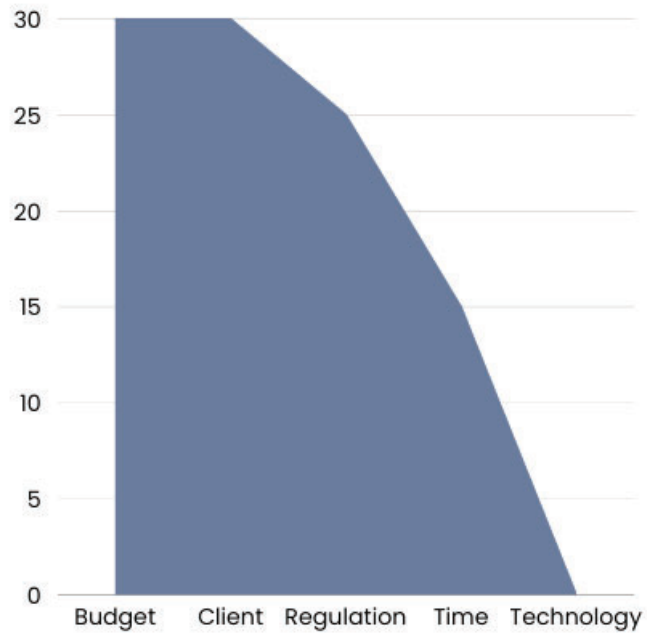


Figure. Which factor overrides design intentions most frequently?

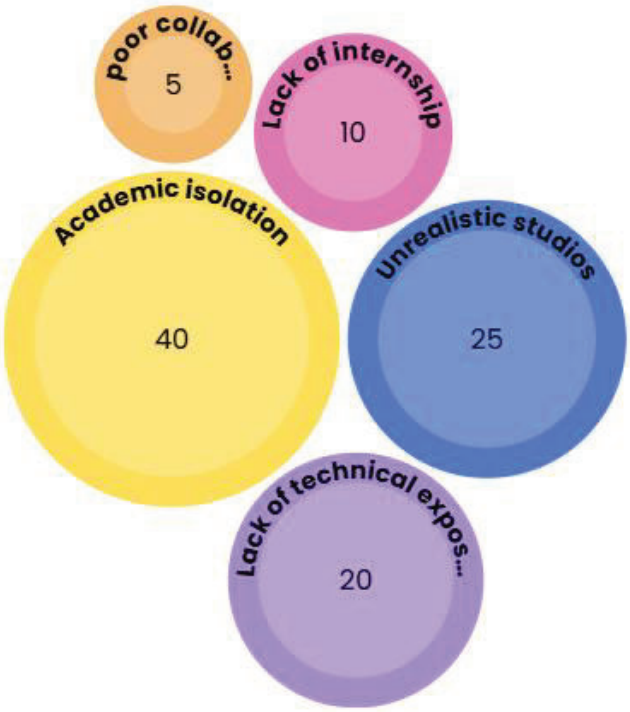


Figure. What creates the biggest disconnect between education and practice?

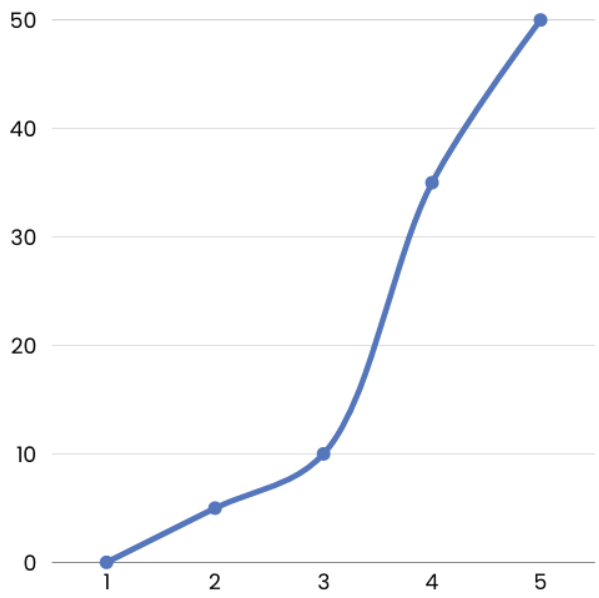


Figure. Architecture will change more in the next 20 years than it has in the previous 50 years.

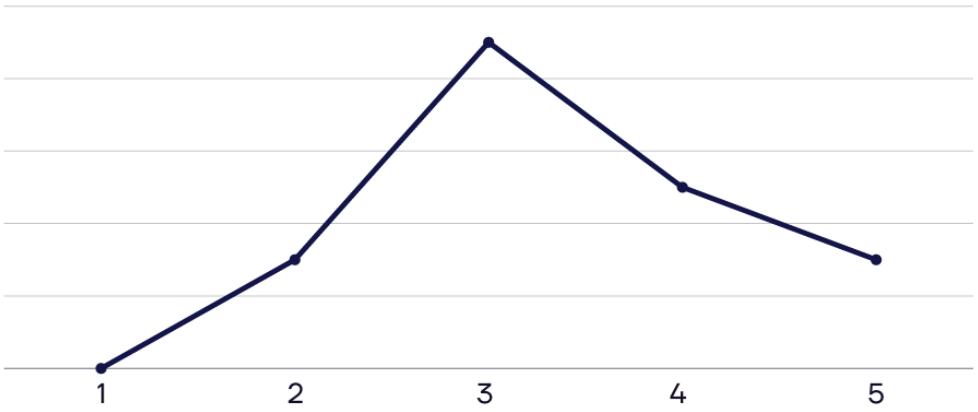


Figure. Ai will improve design quality.

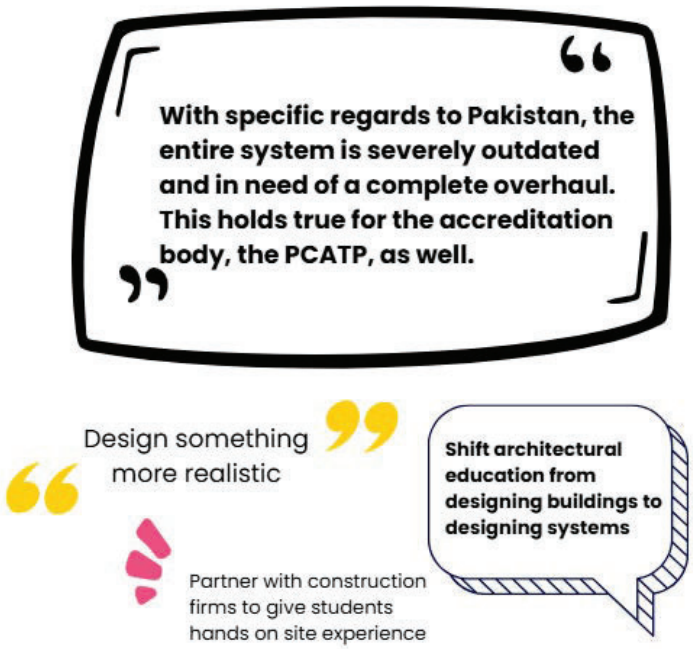


Figure. Highlights the participant's opinions on **What is one major change you would suggest in architectural education?**

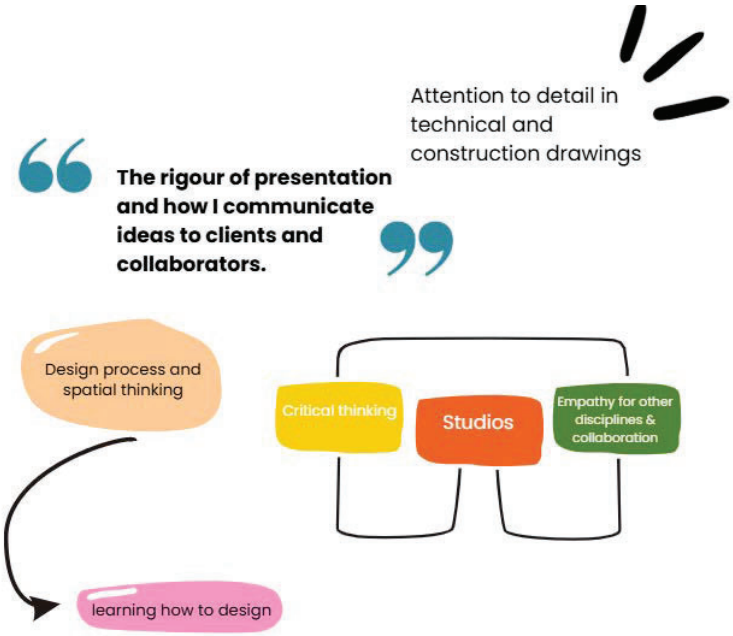


Figure. Highlights the participant's opinion on **What is one major change you would suggest in architectural education?**

DISCUSSION

The data highlights that while the architectural discipline is undergoing a rapid digital and ecological pivot on an international scale, the translation of these trends into developing markets, specifically Pakistan is concerning. The empirical findings of this study, when combined with the institutional datasets of the AIA and RIBA, shows a fundamental structural friction between globalized design paradigms and localized operational realities.

The Real vs. Ideal Gap in Sustainability

Almost all participants agree that sustainability and climate resilience are the most important factors for the future of architecture.

The Duality of AI: Tool of Efficiency vs. Threat to Context

The data shows a deep divide regarding the combination of artificial intelligence and digital automation.

Cultural Homogenization vs. Regional Resistance

When looking at a globalized future, responses depend toward a fear of cultural erasure, where cities risk looking identical due to standardized corporate styles.

The Academic-Practice Disconnect

Both local and international respondents note a historic gap between what is taught in architectural universities and what is required in modern professional practice.

Scale and Power Imbalances in Regional Practice

The data points to a heavy concentration of major project opportunities going toward large, corporate-scale firms.

FUTURE ACTION AND RECOMMENDATIONS

Based on the empirical insights from global and domestic practitioners, Team SAAR proposes the following recommendations for the future of the discipline:

1. *Deploy AI as an Assistant, not a Thinker*: The main idea of design should always come from people. Be connected to the place where they live, how they feel and what they experience. Architecture firms and universities must remember that design is about people and the way they live in a place and that is what makes it special. They have to keep the touch in design and not let Ai take over the creative part.
2. *Teach Systems Thinking over Aesthetics:* Academic curricula must have visual form-making with mandatory modules in construction economics, teach efficiency, building codes, and real-world budget constraints.
3. *Mandate Field-Based Research:* Educational projects must move from idealized, fictional sites. Design studios should also consist of on-site socio-spatial exposure and direct community engagement, forcing students to design for complex, real-world urban realities.
4. *Support Smaller and Local Studios:* Regional regulatory bodies must design affordable, contextual standards of sustainability specifically to local economic limitations, rather than forcing projects to meet expensive, Western green certifications.

CONCLUSION

The architectural profession is changing. It is moving away from the time when individual landmark buildings were really important. Now it is entering a time when buildings and spaces are connected can change and are shared by the community The empirical data collected by Team SAAR focuses that major international architectural trends cannot simply be copied and pasted into a local context without careful adaptation. To fix this problem the Pakistan Council of Architects and Town Planners and universities need to make changes. They need to change the way they do things and what they believe in. This will help students learn things that they can actually use in the world.

REFERENCES

American Institute of Architects. (2024). *AIA firm survey report 2024: Key insights*. https://www.aia.org/resource-center/firm-survey-report

Bredella, N. (2022). *The architectural imagination at the digital turn*. Routledge. https://doi.org/10.4324/9781003253724

Leach, N. (2024). *Architecture in the age of artificial intelligence: An introduction to AI for architects*. Bloomsbury Publishing.

Royal Institute of British Architects. (2024). *The future for architects? RIBA horizon 2034 research project*. https://www.architecture.com/knowledge-and-resources/resources-landing-page/horizon-2034

Vosloo, C. (2023). Future directions in architectural practice. *Athens Journal of Architecture*, *9*(1), 1-30. https://doi.org/10.30958/aja.9-1-1

Survey: Mapping Architectural Thinking Through Voices https://docs.google.com/forms/d/e/1FAIpQLSe8RFjLTcQaeIIVz-nYR_kodh4xTVdtfCqTHGxd2BzYSWW-hA/viewform

Redefining the Role of the Architect:

Sustainability, Resilience, and Human-AI Symbiosis

A Research Report in Contemporary Architectural Practice

Submitted: 15 June 2026

Course: Professional Practice

Group members:

Ayesha Imran

Meerab Farooq

Nabeeha Kamran

Nabiha Nauman

Zara Irfan

Table of Contents

Executive Summary

Architecture has come a long way and has now also reached a point where certain discoveries have been made and many points of contention have also been discovered. There are many structural pressures that make it hard for us to continue using traditional methods of practices which were previously employed. The first being climate change and the current existing structures not able to handle those changes. second being housing not accommodating psychological demands of people. And lastly, Ai being used as a design tool more and more each day. That being said, this report will analyze how all of these problems are inherently the same and in order for us to come to a strong conclusion, that conclusion needs to incorporate all those aspects too.

The way this report has been structured is also the same. We have to take into account the environment and climate related problems from the get-go when designing a space and we can also use Ai to help with that process, make it faster and more seamless. Something that we learnt through the pandemic during Covid was how housing and places of accommodation have a far more important job than just protecting us from weather changes, it also needs to support us emotionally and the spaces need to be constructed in a way that it can effectively complete that purpose. Lastly, helping to look at the way spatial neuroscience and computational intelligence, work together, to allow us to better analyze how a space can both serve humans and be functional is a groundbreaking discovery.

After carefully analyzing a plethora of research available, this report comes to the conclusion that our trained architects as well as Ai systems, that are currently in place today are not on their own sufficient to tackle these problems. What we need to spend more time looking at is a combination of those items, a hybrid model where we use Ai to expand on what our human abilities work on. The value in this model, as seen by research, holds a higher degree of success compared to if those approaches are used on their own.

Further, the above said plethora of research that this report focuses itself around includes tons of peer-reviewed research from cognitive neuroscience, environmental psychology as well as architectural computing, first hand experience of architects working in the fields from various walks of life. We also were able to look at empirical studies that were conducted during 2019 and 2026, providing us a large timeframe to work with. They point us to the direction of looking at AI as an advancing tool that can further what the human cannot achieve instead of looking at it as the enemy. In a way, using it to our advantage where we can find ways to also include neuroarchitecture and prioritizing residential design into the current existing standard of practice.

1. Introduction to Report

Architecture has always been answerable to the conditions of its time. The materials available, the climate to be managed, the social structures to be housed, the technologies to hand all of these shape what a building is obligated to do and how a practitioner is expected to do it. What makes the present moment unusual is not that these conditions are changing but the pace at which several of them are changing simultaneously, and the degree to which their interaction is generating demands that no single approach to practice can adequately meet.

This reports specific focus is the intersection of three themes that, in combination, define the central challenge facing architectural practice in the mid-2020s: ecological sustainability, the resilience of the built environment against compounding environmental and psychological stressors, and the appropriate integration of artificial intelligence into the design process. None of these themes is new in isolation. What is new is the degree to which they have converged, and the degree to which any serious engagement with one of them now requires engagement with the others.

The climate emergency is not an abstract future risk for the profession. Architecture, engineering, and construction together account for roughly 37 to 40 percent of global greenhouse gas emissions (Friston, 2010). Spaces and buildings that were initially made were done using codes that were using older climate estimations, and from a world where the climate changes problems were not as bad, hence obviously those same structures cannot be built today to accommodate the climate we have in this day and age, especially countries like Pakistan, where extreme levels of heat waves are experienced. Areas where lets say flooding occurs more now than a decade before, those same buildings will have a harder time sustaining those weather changes. Keeping that in mind, architects need to make larger scale changes to what they know about design to take this into account. You have to ask a different question of whether that specific building is meeting the demands of what the environment is asking for.

The Covid-19 pandemic also showed us how a space truly has to reflect all facets of what that space means, it needs to be functional yet also serve a human purpose. It does not only provide shelter but is also a space for psychological comfort. When society went through lockdown, people were forced to stay confined to their spaces for prolonged periods of time, this increased feelings of anxiety, depression and loneliness across many groups. Especially societies that were highly communal and social, and the spaces those people inhabited were not suited for that drastic change. Our buildings were not designed for people to be working there while also relaxing and also being in a confined space with multiple other family members for long periods at a time. This is important especially because at this point it is important to take into account research from areas of Psychology as to how a space affects people psychologically and neurologically, even though maybe traditionally this was not such a super important facet architects considered.

While we recognize that AI does not necessarily have all the solutions to all these problems. It takes us a few steps further in definitely better understanding it and how we can analyze the situation with a different lens, new factors we can take into account, and perhaps new possibilities we can explore. Something that AI allows us to do, which human judgement and perception cannot do is, look at different possibilities all at the same time. AI can also allow us to think about different materials and tools, as well as models together in different climate environments at the same time. Because the field of architecture did not have access to these tools in decades prior, this gives us the opportunity to be more meticulous with our work today and deepen our understanding of a possibility, that prior would have costed many resources to even explore as possibilities. Keeping all this in mind, it is important to also think about the downsides of AI and its advancements. Keeping everything aside, AI is AI at the end of the day, it lacks what we call human touch and the outcome can feel emotionless and detached, or

too generalized. Sometimes, AI comes up with conclusions without having any proper basis to it or functionality or without understanding the true purpose and cultural context behind something, which is a challenge definitely hard to navigate. Managing those risks while capturing the genuine analytical value these tools provide is one of the central professional challenges of the present moment.

The purpose of this report is not to survey the field exhaustively but to identify the structural arguments that should guide how the profession orients itself across the next decade. The arguments it advances are grounded in evidence, held with appropriate epistemic humility where the evidence is still developing, and directed at the practical question of what architectural practice should do.

2. Research Methodology

2.1 Scope and Approach

This report uses a qualitative synthesis methodology. That is a formal way of saying that rather than generating new primary data through surveys or experiments, it works by gathering, evaluating, and integrating existing research from multiple disciplines and then drawing structural conclusions from what that body of evidence, taken together, supports. The three primary source categories drawn on are peer-reviewed academic literature from cognitive neuroscience, environmental psychology, architectural computing, and sustainability science; practitioner testimony from documented professional roundtables and institutional webinars; and empirical case studies, including biometric research produced within the architectural and design research community.

The analysis is structured around the three core thematic areas identified in the Introduction. Cross-referencing between themes is used throughout to demonstrate that these are structurally interdependent issues, not separate problems that can be addressed in sequence. Sources have been selected based on publication recency, with priority given to research published between 2019 and 2026; methodological rigour; and direct relevance to the central hypothesis. Where quantitative data is cited, the original source is identified. No citations, author names, journal titles, or empirical findings have been inferred beyond what is explicitly stated in the reviewed materials.

2.2 Primary Source Frameworks

The cognitive and neurological dimensions of this report draw principally on Karl Friston's Free Energy Principle, a framework from cognitive neuroscience describing how the brain generates and tests predictions about incoming sensory experience. Its architectural extensions are developed in a 2026 study published in the journal Entropy, which examined the relationship between procedural memory, environmental expectation, and spatial wellbeing (Frontiers in Psychology, 2026). Architect Akos Orban's TEDx presentation on the unconscious experience of space provides the conceptual framework for the analysis of sensory design. The 2019 A Space for Being installation at Milan Design Week, supported by Johns Hopkins University, provides empirical grounding for the argument that bodily and consciously reported experience of space regularly diverge in ways that have significant design implications.

For the analysis of human-AI collaboration, four primary publications are drawn upon: Architecture in the Age of Artificial Intelligence, second edition (Routledge); Human-AI Collaborative Design in Architectural Studios: Evaluating Paradigm Shifts Across the Six Stages of the Design Process (MDPI Buildings Journal, 2026); Human-AI Collaboration in Architectural Design: A Comparative Analysis of Conceptual and Computational Form Generation (ResearchGate, 2026); and Application of AIGC Technology in Vernacular Architecture Design (ResearchGate). The 2025 MDPI Sustainability Journal study on Formal Feature Identification of Vernacular Architecture Based on Deep Learning provides the technical specificity for the discussion of AI and vernacular continuity.

Something else we took a deeper look at included testimonies of architects from the ArchitectureAu roundtable, Hassell, Wardle, and Archier (2024), NCARB Live which was a webinar on the intersection of AI and Architecture during which a teaching fellow from the Harvard Graduate School of Design touched on both the strengths and points of contention for AI and architecture specifically. The way in which these sources were utilized was by applying them to the context the papers were written in, and not generally extrapolating information and making conclusions generally.

2.3 Methodological Constraints

Neuroarchitecture is something interesting we explored in this report, it a new but fast growing field. A lot of the findings have not been super widely tested but are in the process of being done so. They have not been tested across a variety of different cultures, modes of how different communities operate and different types of populations of people in terms of identity. There is also a great deal of biometric evidence used at many different points but it only points towards a strong foundation of a potential relationship, and not a conclusive proof we are trying to determine.

Similarly, for all of our discussion surrounding AI, the same applies. The tech world is super fast paced and developing rapidly, there are constantly ground-breaking discoveries being made every single day, some that get refuted, some that get further supported. For those reasons, this report is going to take a stance that focuses on the productivity of those models at a large scale, rather than the technicalities of it. Something we want to explore for sure is that human centered design and AI can definitely be used together, to further benefit each other but one cannot be replaced by the other, because they both hold importance in their own way.

3. Literature Review

3.1 The Climate Crisis and Architectural Responsibility

The conversation around sustainable architecture has changed a lot over the past two decades in that same way. Earlier, the focus was mostly on following set rules and codes that we understood worked. Building codes would give certain requirements, and architects would design buildings that simply met those requirements. Because of this, the impact that buildings had on the environment was treated more like a compliance issue, instead of something that should be part of the actual design thinking. However, this way of thinking has become harder to defend because the gap between what building codes ask for and how much damage the building sector actually causes has become too big to ignore. The architecture, engineering, construction sector is responsible for around 37 to 40 percent of global greenhouse gas emissions, and cement production is seen as one of the main causes of embodied carbon at the material level (Frontiers in Psychology, 2026).

The Passive House (Phius) standard is one example of how far sustainable design can go when the demands of what the building needs to be doing are taken seriously from the start. It focuses on things like having very strong insulation, airtight construction, or even reducing thermal bridges, which helps keep the inside of a building comfortable without needing as much mechanical heating or cooling. There have also been new developments in materials that make sustainable architecture more possible than that. Self-healing polymers can repair small types of damage on their own, which can help materials last longer in the long run. Mycelium-based bio-composites, which are made from fungal root structures, can be used as carbon-negative insulation and they do not need a lot of energy to produce and also have natural fire resistance. Cross-Laminated Timber is another important material because it can be prefabricated which can reduce construction time by 25 percent while also keeping carbon stored inside the structure itself (Architecture in the Age of Artificial Intelligence, 2nd ed., Routledge).

3.2 Spatial Psychology and the Limits of Shelter

The research that was done on environmental psychology and neuroarchitecture helps us understand why buildings can technically meet all the legal standards but still fail the people who are actually living inside them for other reasons. Edward Relph's idea of Placelessness is important here because he talks about how people need environments that feel connected to something real and something they can relate with. In his 1976 study, he explains that places are not just physical spaces but they are also tied to memory, culture and also make use of our senses, and feelings. When architecture ignores the specific history or culture associated with a place and physical conditions of a place it can also create spaces that feel empty or disconnected (Relph, 1976). Rem Koolhaas makes a similar point in The Generic City, where he argues that modern global architecture often produces buildings and cities that feel the same everywhere and dont have a sense of personality to them, something specific. These spaces are also usually made for movement and large scale consumption rather than for people to actually feel connected in them (Koolhaas, 1995). Ulrich Beck also adds to this idea by describing modern life as a kind of mass solitary confinement of the ego where people can be surrounded by thousands of others but still feel disconnected and not truly attached to any place because they feel no sense of personal belonging which is a really interesting concept (Beck, 1992).

Karl Friston's Free Energy Principle gives us a more scientific way to understand why this is so important towards our understanding. His idea comes from cognitive neuroscience and explains the brain as something that is constantly making predictions about what it expects to experience almost like a self-protective mechanism. These predictions come from our memory of past lived experiences, even relationships and the brain then compares them to what is actually happening in the environment.

When the environment matches what the brain expects, people feel more comfortable and stable. But when there is a constant gap between what the brain expects and what the space is giving, it can lead to discomfort and feeling stressed in that space because what you imagined was not the outcome (Friston, 2010). A 2026 study in the journal Entropy builds on this concept by showing that people's expectations are deeply connected to environmental memory. To understand this further basically our minds look for familiar patterns and stability in the spaces around us, but the Generic City often takes those patterns away (Frontiers in Psychology, 2026).

The 2019 A Space for Being installation at Milan Design Week gives a strong real-world example of this as well. In this installation, participants moved through different rooms that had different colours, shapes, textures, and sounds while wearing biometric sensors. What was interesting was that what people said they felt did not always match what their bodies were showing. Some spaces that people described as pleasant still caused measurable stress in their nervous systems, while other spaces that seemed more ordinary actually made their bodies feel calmer (Milan Design Week, 2019). This is important for design because it shows that people cannot always tell what a space is doing to them on the inside. A building might look nice or feel opening and welcoming at first but that does not always mean it is supporting the person psychologically or physically.

3.3 Human-AI Collaboration in Design Practice

The research on AI being used in architecture is growing really quickly but not all of it is equally strong. Some of the more useful research is the kind that is based on actual studies and results rather than just predictions about what AI might do. One 2026 comparative study on hybrid human-AI workflows found that the best results came when human spatial intuition was combined with AI's ability to process many variables quickly. This combination helped reduce both mental fatigue and the unconscious biases that can come up when designers are working alone. The study also found that AI-only workflows could create designs that looked organized and complete but they were often not that descriptive when it came to context. On the other hand, human-only workflows were limited by how much information one designer could realistically process at once (Human-AI Collaboration in Architectural Design, ResearchGate, 2026).

Similarly, the 2026 MDPI Buildings study looked at AI's role across all six stages of architectural design from pre-design to presentation. It found that AI is most helpful in the early stages especially when architects are exploring ideas or testing performance through data. However human expertise is still more important in technical documentation and in areas where cultural understanding careful judgment and spatial sensitivity are needed. This shows that AI can support the design process but it cannot fully replace the role of the architect (Human-AI Collaborative Design in Architectural Studios, MDPI Buildings Journal, 2026).

Another important study on AI-enhanced conversational design processes published in the International Journal of Architectural Computing in 2026 points out one of the biggest risks of using AI in architecture. If AI is not guided carefully by humans its designs can easily become generic and disconnected from the actual place they are meant for. The same study explains that current AI systems can produce outputs that are hard to control and do not always show clear design intention. However research on Low-Rank Adaptation techniques for vernacular architecture shows one possible way to deal with this issue. By training AI on specific regional and historical datasets designers can guide the system to produce work that connects more closely to local architectural traditions instead of just repeating global design styles (Application of AIGC Technology in Vernacular Architecture Design, ResearchGate).

4. Findings

Why exactly should sustainability treated as so important

Table 1

Numerical Summary of Key Quantitative Findings

Finding area	Reported value	Meaning in the report
Building sector / AEC emissions	37–40%	Share of global greenhouse gas emissions
Phius ZERO photovoltaic demand	30–50% smaller	PV array size compared with conventional net-zero buildings
Cross-Laminated Timber	Up to 25%	Potential construction schedule reduction
Conscious sensory processing	About 5%	Share of sensory input consciously processed
Unconscious sensory processing	About 95%	Share of sensory input processed below awareness

Note. Values summarize quantitative claims discussed across the Findings section of the report.

Table 1 summarizes the key numerical findings from the report, showing how sustainability, resilience, neuroarchitecture, and human-AI collaboration are supported by measurable evidence across the reviewed research.

4.1 Embedding Ecological Constraints at the Point of Conception

Over the past decade the professional approach to sustainability has changed a lot. Earlier sustainability was mostly something that was checked after the building was already designed through certifications and standards. Now, it is becoming something that has to be included from the very beginning of the design process. The Passive House or Phius, and standard is one of the clearest examples of this shift. It focuses on using very strong insulation and airtight construction and avoiding thermal bridges from the start so that the inside of the building can stay comfortable without needing too much heating or cooling. Projects that aim for Phius ZERO take this even further by also using on-site renewable energy to reach net-zero energy use. Since the building envelope is already so carefully designed these projects usually need photovoltaic arrays that are 30 to 50 percent smaller than the ones needed for more conventionally built net-zero buildings. This is important because it reduces embodied carbon at the systems level and it also shows how early design decisions can have a much bigger environmental impact later on.

At the material level there are also many new developments that are changing what architects can work with. Self-healing polymers are one example because they can repair small surface damage and small cracks on their own without really needing a person to fix them. This helps reduce maintenance waste and also makes building parts last longer. Mycelium-based bio-composites are another very interesting material. They come from the root structures of fungi and can be used as a carbon-negative

option for insulation and lighter structural uses. Since they are grown instead of manufactured they require very little energy to make and can fully biodegrade when they are no longer being used. Phase Change Materials are also being used in building assemblies because they can absorb and release heat as they change phases. This helps keep indoor temperatures more stable and can reduce cooling demands during peak hours.

Cross-Laminated Timber is also changing the structural side of buildings. Because it can be prefabricated it allows construction to happen more quickly and quietly on site. It can reduce total construction schedules by as much as 25 percent while also replacing materials like steel and concrete which use a lot more energy to produce. It is also renewable and stores carbon within the structure itself. Additive manufacturing works in a similar way because 3D printing only places material where it is actually needed, which cuts down on the waste that comes from traditional formwork and subtractive construction methods. Projects like TECLA show that it is now possible to create full livable structures using locally sourced raw earth and agricultural waste which also lowers the carbon cost that usually comes from transporting heavy building materials.

Table 2

Graphical Summary of Key Quantitative Findings

Finding area	Graphical scale (0–100%)	Value
Building sector / AEC emissions	0 25 50 75 100	37–40%
Phius ZERO photovoltaic demand		30–50% smaller
Cross-Laminated Timber		up to 25%
Conscious sensory processing		about 5%
Unconscious sensory processing		about 95%

Note. Bars visualize each reported value or range on a 0–100% scale.

Table 2 presents the same findings in a visual summary format, making it easier to compare the relative importance and strength of each major theme in the Findings section.

4.2 AI's Predictive Capacity in Multi-Variable Climate Analysis

Designing a building for strong environmental performance is not a simple process because there are so many different things happening at the same time. A building's energy use depends on so many different factors like the orientation, shape, materials, windows, insulation, internal heat, how people end up actually using the space and the climate around it. All of these factors affect each other so it becomes really hard for one designer to fully calculate and understand everything on their own. This is

where AI can become useful because it can help process all of these variables much faster and more precisely all at the same time. AI tools are now being used in almost every stage of the design process, from understanding the original project brief and creating early design ideas to testing energy performance and being able to coordinate structures and also making presentations for clients.

Research from Architecture in the Age of Artificial Intelligence also shows that AI can make the process much faster by reducing the time between the first design idea and a more detailed evidence-based performance check that can be looked at before the actual plan starts (Architecture in the Age of Artificial Intelligence, 2nd ed., Routledge). At the ArchitectureAu roundtable in 2024, Sian Willmott of Hassell described her practice's transition from AI experimentation to embedded everyday use: partnering with organisations such as Materials Index to conduct AI-enabled audits calculating the carbon footprint and material reuse potential of building components in real time, enabling sustainability to function as a live design constraint rather than a retrospective assessment (Hassell, Wardle, and Archier practitioners, 2024). James Loder of Wardle outlined how mid-sized practices are building bespoke Large Language Models to assist with Life Cycle Assessments at the earliest stages of design development, bringing whole-life cost and carbon data into conversations that have historically been shaped by aesthetic and programmatic considerations alone.

Computational Fluid Dynamics modelling allows practitioners to simulate the airflow performance of windcatchers and courtyard typologies with a precision that qualitative precedent study cannot achieve, validating traditional techniques against contemporary climatic conditions. The same infrastructure enables the performance testing of hydromorphic facades and shape-memory material assemblies under the full range of climatic conditions a building is likely to encounter across its service life.

4.3 The Qualitative Limits of AI in Ecological Ethics

The computational power that makes AI useful in multi-variable performance analysis does not extend to the ethical dimensions of ecological decision-making. AI systems can calculate the carbon intensity of a proposed material assembly; they cannot determine whether the extraction of that material is appropriate given its social and ecological impacts in the region of origin, whether the communities most affected by the building's environmental footprint have had meaningful participation in its design, or whether a net-zero energy balance justifies ecosystem displacement during construction.

The "black box" problem makes this issue even more complicated. George G. from Harvard Graduate School of Design, while speaking at the NCARB Live: AI and Architecture webinar explained that current AI generative systems do not clearly show how they make decisions properly. In other words the user cannot fully trace the logic behind why a certain design was produced and even the system itself does not explain its reasoning in a clear way (NCARB Live: AI & Architecture Webinar, 2024). This becomes a major problem in architecture because if an AI-generated recommendation leads to an environmentally harmful result it is not just a small technical issue this is a big problem. It becomes a professional and ethical failure because architects cannot explain or defend how that decision was made because there was no proper reasoning behind it.

Josh FitzGerald from Archier adds another important point in the ArchitectureAu roundtable. He explains that AI tools use a lot more energy than regular digital tools. This matters because architecture as a field cannot claim to care about sustainability and then use high-energy tools without thinking about their own environmental cost (Hassell, Wardle, and Archier practitioners, 2024). FitzGerald is not saying that AI should not be used at all what he is actually trying to say is that AI should be used carefully and only when it actually adds enough value to justify the energy it uses. So AI should be used for tasks

where its analysis leads to a clear overall benefit not just during the design process but across the full life cycle of both the computation and the building itself.Beyond Shelter: Resilient Design

4.4 Fortification as a Design Standard

The basic idea of shelter when understood as just a structure that protects people from the weather is no longer enough for residential architecture. The pandemic made this very clear because it showed that housing cannot only be judged by whether it has walls a roof and basic protection from the outside. Many buildings technically did what the legal definition of shelter asked them to do but they still failed the people living inside them. People were left feeling mentally unsupported feeling socially isolated and just overall unable to change their homes based on new daily needs. This does not mean those buildings were broken or poorly built in the traditional sense. But what It means is that the standards themselves were too limited. There was a clear gap between what the building was required to provide and what people actually needed from the space.

Because of this this report suggests replacing the idea of shelter with the idea of fortification. Fortification here does not mean anything military related as we commonly understand the word to mean but instead means a building's ability to protect and support the people inside it over time and through changing conditions. In practical terms this means residential design needs to include certain features as basic requirements not as luxury add-ons. Homes need adaptable and multi-functional floor plans so that different activities can happen at the same time without creating constant conflict in the space. They also need rooms that can support isolation when necessary and with proper access to basic sanitary needs. Private outdoor space should also be treated as a standard requirement along with operable natural ventilation and enough daylight to support sleep cycles and overall human health.

4.5 Vernacular Wisdom and the Neo-Vernacular Resurgence

Vernacular architecture is something that the field is only now starting to fully appreciate, even though these traditions have existed for centuries. A lot of these older building methods were already doing the kind of work that this report is calling fortification. Things like passive cooling systems, thick thermal mass walls, windcatchers, and courtyard layouts based on the sun and local climate were not just decorative choices. They were practical design solutions that developed over time through people constantly adapting to their environment and culture. These buildings were able to stay cooler, last longer, and make sense to the people living in them. This is important because cognitive neuroscience now shows that people need spaces that feel familiar, grounded, and connected to their context in order to feel psychologically stable.

In the 20th century, a lot of these vernacular practices were pushed aside by industrialised modernism. Modern architecture often focused on steel and glass buildings that could look the same anywhere and depended heavily on mechanical HVAC systems. These buildings were often not connected to the local climate, culture, or identity of the place they were built in. This is what ideas like the Generic City and Placelessness are trying to explain. The current return to neo-vernacular design is not about rejecting modernity or going backwards. It is more of a practical response to the problems caused by overly generic design. Architects are now looking again at traditional techniques, like rammed earth walls for thermal mass, windcatchers for natural ventilation, and steep roofs for tropical rainfall, and combining them with modern engineering. This allows buildings to be culturally meaningful, energy-efficient, and still able to function during things like power outages.

The 2025 MDPI Sustainability Journal study on deep learning and vernacular architecture shows how AI can also help with this process. The study found that neural networks can identify and organize the smaller formal details and environmental logic found in traditional buildings in a way that would be

very hard to do manually (Formal Feature Identification of Vernacular Architecture Based on Deep Learning, MDPI Sustainability Journal, 2025). This shows that traditional buildings are not just important because of how they look. They also hold a lot of knowledge about climate, materials, and how people live in specific places. AI can help architects access that knowledge more deeply and bring it into current design, without just copying old styles for aesthetic reasons.

4.6 Systemic Durability and Climate Adaptation

Architectural resilience is not just about whether one building can perform well on its own. It is also about whether the built environment as a whole can handle, absorb, and recover from different types of climate related disruptions. A lot of buildings were designed based on old weather patterns, but those patterns do not fully match the climate we are living in now. As extreme weather becomes more frequent and more intense, many buildings are starting to become less functional, not because they were built wrong at the time, but because the climate around them has changed. If architecture is meant to create buildings that last for 50, 100, or even 200 years, then the profession cannot keep designing based on climate conditions that no longer reflect reality.

There are also new technologies that make it possible for buildings to respond to the environment in smarter ways. Chromogenic glazing, using Vanadium Dioxide thin films, allows the building envelope to react to solar heat on its own. Once a certain temperature is reached, it can reflect infrared radiation and reduce cooling needs, without needing a complicated electrical system. Shape-memory materials and hydromorphic assemblies can also help facades respond to changes in humidity and temperature in real time. This means the facade is not just a fixed wall or barrier anymore, it becomes part of how the building manages the environment around it. When these technologies are included from the beginning of the design process, and not just added later as an afterthought, they help create architecture that responds to climate change instead of just trying to survive it.

Human Experience and AI Intelligence in Architectural Practice

4.7 Neuroarchitecture and the 95 Percent Problem

The sensory side of future architecture is also something that is becoming more important, especially through the field of neuroarchitecture. Neuroarchitecture is still something the profession is only starting to properly include, but its main idea is really important. It argues that the spaces around us affect us before we are even consciously thinking about them. As architect Ákos Orbán explains in his TEDx presentation, only around five percent of the sensory information coming into our brain is consciously processed, while the other 95 percent happens below our awareness. This means that our emotions, behaviours, and spatial memories are constantly being shaped by the environments around us, even if we do not fully realise it (Orbán, TEDx). So things that architects may have treated as just aesthetic choices, like the curve of a wall, the warmth of a material, the echo in a room, or the colour of daylight coming through a window, are actually doing much more. They are affecting how people feel and behave inside a space.

Karl Friston's Predictive Processing Framework also helps explain this in a more scientific way. Friston argues that the brain is not just passively taking in information, but is constantly predicting what it expects to experience (Friston, 2010). These predictions come from past memories, routines, relationships, and familiar experiences, and then the brain compares those expectations to what is actually happening in the environment. When the space matches what the brain expects, people tend to feel more calm and comfortable. But when there is a constant mismatch between what the brain expects and what the space is giving, it can create stress, anxiety, and mental tiredness. A 2026 study in Entropy

adds to this by showing that human expectations are strongly connected to procedural and relational memory, and that the mind naturally looks for stability through familiar environmental patterns that have been built over time (Frontiers in Psychology, 2026).

4.8 Empirical Verification: A Space for Being

The 2019 A Space for Being installation at Milan Design Week is a really important example of how people respond to space without even fully realizing it. In this installation, visitors moved through different rooms that were designed with different colours, shapes, materials, textures, and sound conditions. While they were walking through these rooms, they were also wearing biometric sensors that measured things like heart rate variability, galvanic skin response, and other bodily reactions. What the data showed was actually really interesting because what people said they felt about a space did not always match what their bodies were showing. Some spaces that people described as nice or pleasant still created signs of stress in their nervous system, while other spaces that seemed plain or not that impressive actually made their bodies calmer (Milan Design Week, 2019). This shows that the body and the mind do not always experience space in the same way, and in some ways the body can be a more honest measure of what a space is actually doing to a person.

Later research has taken this idea further by creating more structured ways to study how people respond to buildings and spaces. These methods bring together cognitive neuroscience and environmental psychology into the design process. They use tools like mobile brain imaging, heart rate variability tracking, and skin conductance measurement to study how a space affects people across different emotional and psychological areas. This can include things like pleasure, coherence, fascination, and how much a space feels like home. What this does is important because it gives architects actual measurable evidence for things that used to mostly be based on intuition or personal professional judgement.

4.9 The Multisensory Design Language

The actual design impact of neuroarchitecture is really important because it shows that the choices architects make are not just visual or aesthetic choices but they affect how people function inside a space. Natural light for example is not just about making a room look nice or bright. The type of light, where it comes from, and how it changes throughout the day can affect circadian rhythm, cortisol levels, and serotonin production. So designing with light is also designing for the body and how it works. Materials also matter a lot because people do not only experience space through what they see but also through what they touch and feel. Textures and surfaces can affect people in ways that are sometimes even stronger than visual design. Materials like charred timber, unpolished stone, and woven textiles can give people a stronger sense of grounding because they connect the body to the real physical space around it. Rounded and curved forms also tend to create lower stress responses than sharp angular forms and this has been found across different cultures. Sound is also a major part of this because acoustic design can affect focus, stress recovery, and how well people are able to think and perform in a space.

There are also older examples that show that architects have cared about these ideas for a long time even if the science behind it is more recent. Alvar Aalto’s Paimio Sanatorium from 1933 is one example because it used specific colours based on what bedridden patients would see, it had windows that could open for fresh air and it had furniture designed to make breathing easier. Jan Duiker’s Zonnestraal Sanatorium is another example because it used concrete and glass in a way that allowed as much sunlight as possible to enter the building which is something that connects to how architects now use daylight simulations. Both of these examples also connect to the larger Bauhaus idea which was

about bringing together art, craft, technology, and material knowledge into one complete architectural approach. But over the 20th century this became more broken up because different parts of the profession became separated from each other. Now we are at a point where architecture needs to bring that kind of integration back again.

4.10 The Hybrid Human-AI Model in Practice

The combined demands of sensory design and strong environmental performance are too complex for one architect to fully handle alone without some kind of computational support. There are just too many things that need to be studied at the same time. A building has to work environmentally but it also has to support the people inside it emotionally, mentally and physically. This is where AI becomes useful because it can test hundreds of design variations very quickly, it can look at whole-life carbon impacts from the early design stages, and it can also help identify the environmental and formal logic found in vernacular buildings at a scale that would be very hard for humans to do manually.

The 2026 ResearchGate comparative study also supports this point because it found that hybrid workflows, where human spatial intuition is combined with AI's ability to process many variables quickly, worked better than either approach on its own. This combination helped reduce mental fatigue and also helped limit the unconscious biases that can happen when one designer is working alone. The study also found that AI-only workflows could create designs that looked complete and organized but were often weak when it came to real context, while human-only workflows were limited by how much information one person could realistically process (Human-AI Collaboration in Architectural Design, ResearchGate, 2026). Similarly, the 2026 MDPI Buildings study looked at AI across all six design phases and found that AI was especially useful in early design exploration and performance testing, but that human expertise was still more important in technical documentation and other detailed stages where precision and judgment matter more (Human-AI Collaborative Design in Architectural Studios, MDPI Buildings Journal, 2026).

George G. from Harvard Graduate School of Design explains that one of AI's biggest values in architecture is multimodality. This means AI can move between different kinds of design information very quickly, like text to image, image to 3D model, or environmental data to performance simulation. This changes the early design process because architects can test and move through ideas much faster than before (NCARB Live: AI & Architecture Webinar, 2024). Dena Prestos, speaking at the same event, also makes an important point that AI should not replace the architect's judgment. Instead, the architect still has the final responsibility and AI should be used to improve their work and their responsibility toward public health, safety, and welfare.

Research on AIGC technology in vernacular architecture also shows how AI can be trained in a more specific and place-based way. Through Low-Rank Adaptation techniques and custom-trained large language models, designers can teach AI the geometric, material, and spatial rules of local traditional architecture. This means AI does not have to just produce generic global-looking forms, but can instead create outputs that are connected to regional and historical building traditions (Application of AIGC Technology in Vernacular Architecture Design, ResearchGate). ArchDaily also makes a similar point by showing that data-trained AI can help designs come from a specific material and spatial history, while human design is still needed to understand things like time, weathering, aging, and how materials change over decades. Those are the things that make a building feel like real architecture and not just construction (Vernacular Building and AI: Can Data Alone Bridge the Gap?, ArchDaily Insights).

5. Discussion

5.1 The Insufficiency of Independent Agency

The main pattern that comes up across all the research is that neither human intelligence nor AI is enough on its own for what architecture needs today. Human designers are still extremely important because they bring ethical responsibility, lived understanding of space, cultural awareness, and the ability to think about the actual people who will live in and use the building. But at the same time, humans also have limits. One person cannot realistically process every environmental, psychological, structural, and cultural variable of a building all at once. There is just too much information happening at the same time. AI on the other hand can process huge amounts of data very quickly, recognize patterns across large datasets, and test many variables without getting tired. But AI also has its own major limits. It does not have real intention, cultural understanding, moral responsibility, or the lived experience of being inside a space. And those are the things that make architecture meaningful and not just technically functional.

Because of this, the research keeps pointing toward the same conclusion which is that the strongest approach is a hybrid one. AI should be used for its computational abilities, but its outputs still need to be guided and judged by human architects. This combination works better than either humans or AI working alone. It is useful for environmental performance, for understanding how spaces affect people psychologically, and for keeping architecture connected to culture and place. So this is not just about one specific AI tool or one specific project, it shows that the two kinds of intelligence work best when they support each other.

5.2 Why sustainability is a big problem

The evidence shows that environmental performance can no longer be treated as something architects check at the end of the design process. It cannot just be a certification layer added after the building has already been designed with other priorities in mind. With AI tools now being able to look at whole-life carbon, material reuse, and performance simulations from the early stages, sustainability can become part of the actual design process from the start. This means these tools should help shape the concept itself, instead of only judging the design after the main decisions have already been made. The Passive House and Phius ZERO standards, the adoption of Cross-Laminated Timber and mycelium-based bio-composites, and the integration of Phase Change Materials represent a convergent set of technical advances that make genuine ecological performance achievable within the constraints of current practice, provided that AI's multi-variable modelling is deployed from the outset and directed by human judgment capable of evaluating the qualitative ethical dimensions that computational analysis cannot resolve.

5.3 The Neurological Basis of Spatial Obligation

The biometric evidence from A Space for Being and the theoretical framework provided by the Predictive Processing literature together establish that architecture's obligation to its occupants operates at the neurological level, not merely the functional or aesthetic one. Spatial decisions that have historically been treated as matters of preference generate measurable physiological consequences that the occupant has no conscious access to and therefore cannot evaluate or resist. This means the architect's responsibility extends to the design of unconscious experience, and that the tools required to discharge this responsibility, biometric evaluation frameworks, neuroarchitectural assessment protocols, multisensory design languages grounded in empirical evidence, need to be integrated into standard practice rather than treated as research-stage specialisms.

5.4 Why culture can also be a design problem

The Predictive Processing framework, the research on vernacular architecture, and the discussion around Placelessness all point to a similar idea. People need spaces that feel culturally specific, physically grounded, and connected to history in order to feel psychologically stable. These are also the exact things that a lot of globalized architecture has removed by making buildings feel the same everywhere. So resisting Placelessness is not just about making buildings look more interesting or more local. It is also connected to how the brain works. When a space has no familiar context, no material depth, and no connection to memory or culture, the brain has to work harder to make sense of it which can create stress and instability.

AI can help with this, but only if it is used carefully. If AI is trained on historical, regional, and vernacular datasets, it can help bring some of that cultural and environmental continuity back into contemporary design. But the important part is that humans still need to decide what data is being used and why. The architect has to guide the process, because AI on its own cannot understand culture, memory, or place in the same way a human can.

5.5 The architect having more than one job

Across all the research looked at in this report, one thing becomes really clear. The role of the human architect cannot be replaced, but it also needs to be understood differently. The architect is not just someone who creates forms or makes buildings look a certain way. In the context of AI, the architect becomes the person who guides the whole process and makes sure the final outcome is ethical, culturally appropriate, and actually useful for the people who will live in or use the space. For example, AI might create a design that looks visually complete but does not fit the culture of the place. It might create a sustainability model that improves energy performance but ignores how the building affects the community. Or it might create a sensory design that performs well through biometric data but still does not work for the specific people who are actually going to inhabit it. These are not just failures of AI or computation. They are failures of human oversight. This is why the architect’s role becomes even more important when AI is used more widely. The value of the architect is in being able to judge AI outputs through ethical, cultural, spatial, and human experience based criteria. These are things that an algorithm cannot define on its own, so human judgment still has to remain at the center of the process.

6. Conclusion

6.1 The Architecture of the Coming Decades

The future of architectural practice is not a break from the discipline's history. It is a return to its deepest obligations, equipped with tools that make those obligations newly achievable. The climate-responsive intelligence of vernacular architecture, the multidisciplinary sensory craft of the Bauhaus, and the evidence-based spatial empathy of the early modernist sanatorium designers were marginalised by the economic logic of globalisation, the fragmentation of professional practice, and the homogenising pressures of the Generic City. Their reinstatement is now both technically possible and professionally necessary.

The convergence of neuroarchitectural research, which provides empirical verification of how environments shape embodied experience, and artificial intelligence, which provides the computational reach to model, simulate, and optimise at previously impossible scales, creates an opportunity to design environments that work in genuinely rigorous and measurable ways. Environments that actively support psychological homeostasis by providing the sensory and contextual anchoring that the predictive brain requires. Environments that sustain their occupants through crises without becoming their prisons. Environments that restore Place, specific, historically layered, culturally legible, sensorially rich, in a world that has generated vast quantities of non-places in their stead (Augé, 1992).

6.2 Future Guidance for Practice

Architectural practice now has a set of responsibilities that come directly from the research looked at in this report. This is not just for individual architects but also for studios, institutions, and professional bodies too. One of the main points is that AI should not be treated like an extra tool that architects can choose to use or ignore. It is becoming part of what responsible design practice looks like. The research shows that the quality and depth of a design can change depending on how much computational support the architect is able to use. Because of this, knowing how to work with AI is not just a special skill anymore, it is becoming something architects need to know as part of their basic professional practice.

But this does not mean AI should just be used without control or proper judgement. There need to be clear ways of checking whether AI outputs actually make sense culturally, ethically, and spatially. These checks cannot come from the AI itself, they have to come from human architects. Practices that work in specific regions or cultural contexts also need to be careful about what kind of data their AI tools are trained on. They should be using vernacular, historical, and climate specific material so that the designs connect to a real place and a real context, instead of becoming another generic building that could exist anywhere. The environmental cost of using AI also has to be counted in whole-life carbon assessments because AI itself uses energy. It should be used when it actually adds enough value to justify that energy use, not just because it feels new or impressive.

At the level of housing, the idea of the fortified dwelling should also be treated as a basic requirement and not as a luxury feature. This means homes should have adaptable floor plans, rooms that can work independently when needed, access to outdoor space, operable ventilation, and daylighting that supports the body and mental health. These things should not be seen as premium upgrades. They are basic conditions for people to live properly especially when they have to spend long periods of time inside their homes. The biometric and neurological evidence behind these ideas is strong enough now that they should start being included in building guidance, professional standards, and codes of practice.

6.3 Challenges, Limitations, and Research Gaps

There are also some limits to this report that need to be mentioned clearly. The research around neuroarchitecture is really interesting and there is a lot of strong evidence but it is still a field that is developing. A lot of the findings have not been tested across all kinds of cultures, populations, climates, and communities. There also is not one fully standard method that all researchers use yet, which makes it harder to directly compare all the studies to each other. The biometric evidence from A Space for Being is also important but it comes from one specific installation, so it should be understood as a strong indication of a relationship rather than something that can be applied everywhere without more testing.

The same limitation exists with AI because the field is changing extremely fast. A lot of the sources used in this report are from 2024 to 2026, and the specific tools and limitations they talk about might change very quickly. That being said, the larger argument of this report is not only about one specific AI tool or one specific technology. The main point is that human intelligence and computational intelligence work best together, that human judgment cannot be replaced, and that architecture still has ethical and cultural responsibilities. These larger ideas should still stay relevant even as AI becomes more advanced, but the technical details will need to keep being updated.

Another limitation is that a lot of the research used in this report comes from high-income and English-speaking contexts. This matters because the questions around vernacular design, cultural memory, and architectural responsibility become even more urgent in places with fewer resources and stronger economic pressures. So this report is not trying to claim that it covers every global context equally. Instead, this limitation shows that more research needs to be done across different parts of the world and across more diverse architectural conditions. This does not mean the argument should be ignored, but it does mean it should be held with some humility.

Architecture has always been about working between what already exists and what can be made. It has to respond to the site, climate, culture, history, and the needs of the people who will live there. Neither AI on its own nor human thinking on its own changes that basic responsibility. What has changed is that architects now have access to tools that can make some parts of the process faster, more detailed, and more precise. But because these tools are more powerful, the responsibility for how they are used also becomes bigger. The buildings of the future should not be judged only by how new they look or how advanced the technology behind them is. They should be judged by how well they actually support and sustain the people who have to live inside them.

References

Augé, M. (1992). Non-places: Introduction to an anthropology of supermodernity. Verso.

Beck, U. (1992). Risk society: Towards a new modernity. Sage Publications.

Formal feature identification of vernacular architecture based on deep learning. (2025). MDPI Sustainability Journal, 17(4), Article 1760.

Friston, K. (2010). The free-energy principle: A unified brain theory? Nature Reviews Neuroscience, 11(2), 127–138. https://doi.org/10.1038/nrn2787

Frontiers in Psychology / Entropy. (2026). Predictive processing, free energy principle, and relational memory: Neurological foundations of environmental expectation. Entropy [neurocognitive issue].

Hassell, Wardle, and Archier practitioners. (2024). How to integrate AI into architectural processes. ArchitectureAu Roundtable.

Human-AI collaboration in architectural design: A comparative analysis of conceptual and computational form generation. (2026). ResearchGate Publication Portal.

Human-AI collaborative design in architectural studios: Evaluating paradigm shifts across the six stages of the design process. (2026). MDPI Buildings Journal, 16(7), Article 1445.

AI-enhanced conversational design processes: A systematic review. (2026). International Journal of Architectural Computing.

Application of AIGC technology in vernacular architecture design. (n.d.). ResearchGate Architecture & Heritage Literature.

Koolhaas, R. (1995). The generic city. In S, M, L, XL. Monacelli Press.

Milan Design Week. (2019). A space for being: Biometric spatial experience installation [Supported by Muuto and Johns Hopkins University].

NCARB Live: AI & architecture webinar. (2024). Featuring George G. (AI Teaching Fellow, Harvard Graduate School of Design) and Dena Prestos [Video]. NCARB/YouTube.

Orbán, Á. (n.d.). Neuroarchitecture and the unconscious experience of space [TEDx Talk, Video]. YouTube.

Relph, E. (1976). Place and placelessness. Pion Limited.

Routledge. (2nd ed.). Architecture in the age of artificial intelligence.

Vernacular building and AI: Can data alone bridge the gap? (n.d.). ArchDaily Insights.

The Future of Architectural Education and Practice

Architects of Tomorrow: Exploring AI, Climate, Identity, and Education

Razia Hassan School of Architecture (RHSA)
Beaconhouse National University

Prepared By:
TriArc

Muhammad Umer Bilal
Dawood Ahmed
Affan Adeel
Ahmed Fahid

Course: Professional Practice

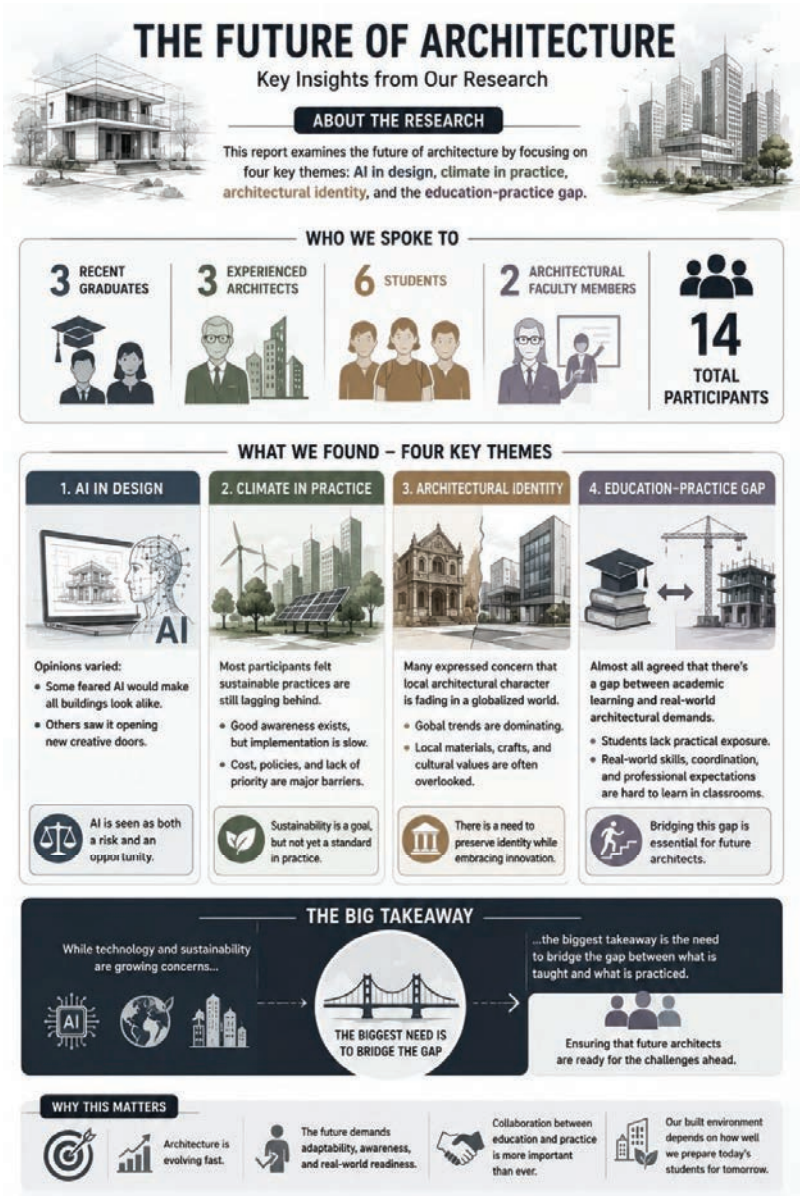
Instructor: M Omar Farooq

Date of Submission:
15th of June, 2026

Table of Contents

Executive Summary

This report examines the future of architecture by focusing on four key themes: AI in design, climate in practice, architectural identity, and the education-practice gap. We interviewed 14 people: 3 recent graduates, 3 experienced architects, 6 students, and 2 architectural faculty members. On AI, opinions varied: some feared it would make all buildings look alike, while others saw it opening new creative doors. On climate, most participants felt sustainable practices are still lagging behind. Regarding identity, many expressed concern that local architectural character is fading in a globalized world. Finally, almost all agreed that there's a gap between academic learning and real-world architectural demands. In short, while technology and sustainability are growing concerns, the biggest takeaway is the need to bridge the gap between what is taught and what is practiced ensuring that future architects are ready for the challenges ahead.



1. Introduction

Architecture is at a turning point. Technology, the climate, cultural shifts, and education are all changing rapidly, and so must the role of the architect. The profession is no longer limited to designing buildings and producing drawings. Today, architects are expected to respond to environmental challenges, work with emerging technologies, preserve cultural values, and adapt to an industry that is evolving faster than ever before. The world around us is changing through digital innovation, urban growth, climate emergencies, and globalization, and these forces are directly shaping the way buildings are imagined, designed, and constructed. Understanding how architects and future architects view these changes is becoming increasingly important if the profession is to remain relevant in the years ahead.

This research was conducted to explore these changes and to better understand the direction in which architecture is moving. Rather than focusing on technical solutions or predicting one fixed future, the study aims to gather different perspectives from people who are directly connected to the field. Through conversations with architecture students, recent graduates, experienced professionals, and architectural faculty members, the report explores how different generations within the profession understand the opportunities and challenges that lie ahead. The goal is not to prove a particular argument, but to identify the ideas, concerns, and expectations that continue to appear across these discussions.

The first theme of this research is “Artificial Intelligence and the future of design”. AI and digital tools are already changing the way architects work, from concept development and visualization to documentation and research. What once took days can now be completed within hours using advanced software and generative design tools. At the same time, these developments raise important questions about creativity and authorship. If technology becomes capable of generating designs, what remains the unique contribution of the architect? Will AI become a creative partner that allows architects to work more efficiently, or could it lead to a future where designs become repetitive and disconnected from human experience? By exploring these questions, the study hopes to understand how architects view the relationship between technology and creativity, and how future professionals can make use of AI without losing the human qualities that define good architecture.

The second theme focuses on “climate and sustainability”, an issue that can no longer be treated as an optional consideration. Around the world, cities are facing the effects of rising temperatures, water shortages, flooding, pollution, and increasing energy demands. These challenges directly affect the built environment and place greater responsibility on architects to design buildings that are environmentally responsible and resilient. Sustainable architecture is no longer only about using eco-friendly materials or adding green features; it is about creating spaces that respond to local climates and support long-term environmental well-being. This research seeks to understand whether future architects feel prepared to address these challenges and whether current architectural practice and education are keeping pace with the growing urgency of climate change.

The third theme explores “identity and culture in architecture”. As global trends, social media, and international design influences spread more rapidly than ever before, many cities are beginning to look increasingly alike. Modern architecture often adopts styles and materials from around the world, but in doing so, local traditions and regional identities can sometimes be overlooked. Architecture has always reflected the history, culture, and values of the communities it serves, and many believe that preserving this connection remains essential. This research therefore investigates how architects perceive the balance between innovation and tradition. It asks whether local architectural identity can continue to thrive in an increasingly globalized world and what role future architects should play in protecting and adapting cultural values for future generations.

The fourth and final theme examines the “gap between architectural education and professional practice”. While architecture schools provide students with design thinking, creativity, and theoretical knowledge, many graduates feel that the transition into professional practice can be challenging. The realities of construction, project management, client interaction, collaboration, and rapidly changing technology often require skills that are developed outside the classroom. At the same time, the profession itself is evolving, creating new expectations for architects that did not exist only a few years ago. This study aims to understand whether current educational systems are preparing students for these realities and to identify areas where stronger connections between academia and practice can be developed.

Ultimately, this research was undertaken because the future of architecture depends on understanding these four interconnected areas. Artificial intelligence, climate responsibility, cultural identity, and educational reform are not separate issues; together, they shape the way architects will think, work, and contribute to society in the coming decades. By bringing together the views of students, educators, and practicing architects, this report hopes to contribute to a wider conversation about the future of the profession. The findings are intended to highlight emerging concerns, encourage critical discussion, and provide a clearer picture of the skills, values, and perspectives that tomorrow's architects will need in a world that continues to change.

2. Methodology

2.1 Research Approach

This study adopts a qualitative research approach to explore how different groups perceive the future of architecture and the challenges that may shape the profession in the coming years. The objective of the research was not to collect large amounts of statistical data, but rather to understand the ideas, concerns, and expectations of people who are directly connected to the architectural field. Topics such as artificial intelligence, climate change, cultural identity, and the relationship between education and practice are complex and often influenced by personal experiences. Because of this, a qualitative method was considered the most suitable way to gather meaningful and detailed responses.

Instead of focusing on fixed hypotheses or attempting to predict a single future for the profession, the study aimed to understand how people from different backgrounds interpret the changes currently taking place around them. The emphasis was placed on depth of understanding rather than the quantity of responses. This approach allowed participants to discuss not only what they think will happen in the future, but also why they hold those opinions and how their experiences have shaped their perspectives.

2.2 Selecting Diverse Voices

To create a balanced and well-rounded understanding of the subject, the study included participants from different stages of architectural education and professional practice. A total of fourteen individuals took part in the research. This group consisted of six architecture students, three recent architecture graduates with less than five years of professional experience, three experienced practicing architects with several years in the industry, and two architectural faculty members involved in higher education.

The participants were selected purposefully rather than randomly. The intention was to engage individuals who interact with the realities of architectural education and practice on a regular basis. Students contributed fresh perspectives and highlighted the expectations and concerns of the

upcoming generation of architects. Recent graduates provided insight into the transition from university to professional life, while experienced architects reflected on how the profession has changed over time. Faculty members offered an academic viewpoint and helped bridge discussions between educational systems and industry expectations.

Bringing together these different voices allowed the research to capture both common patterns and contrasting opinions. The diversity of the participant group made it possible to compare how the same issue—such as the role of AI or the importance of sustainability—is understood by people with different levels of experience and responsibilities within the profession.

2.3 Gathering Perspectives

Information for the study was collected using a combination of informal conversations and short written response forms. This mixed method was chosen to provide a broader and more complete understanding of the participants' views. The first stage involved casual one-on-one conversations in which participants were encouraged to speak openly about the future of architecture. Instead of following a strict interview format, the discussions were allowed to develop naturally around the four major themes of the research: artificial intelligence, climate and sustainability, architectural identity, and the gap between education and professional practice.

The conversational format was particularly useful because it encouraged participants to express ideas freely without feeling restricted by a formal question-and-answer setting. It also allowed follow-up questions to be asked whenever an interesting point was raised, helping to explore the reasoning behind individual opinions.

To complement these discussions, each participant was also provided with a short-written response form that was collected the following day. The form contained one or two open-ended questions for each research theme. The purpose of this additional step was to give participants time to think more carefully about their answers. In many cases, people express different ideas when they have the opportunity to reflect and write, compared to when they respond immediately during a conversation. By including both verbal and written responses, the study was able to capture immediate reactions as well as more thoughtful and detailed reflections.

2.4 How We Analyzed Responses

Once all conversations had been completed and the written forms were collected, the information was reviewed and organized using a thematic analysis approach. This method was selected because it allows recurring ideas and patterns to emerge naturally from the data rather than forcing responses into predetermined categories. Since the research was based on opinions and experiences, thematic analysis provided a flexible and effective way to interpret the information gathered.

The process began by carefully reading through the written forms and revisiting notes taken during the conversations. Key statements, repeated ideas, and common concerns were highlighted and grouped together. Responses were then compared across the different participant groups to identify areas of agreement as well as points where opinions differed. For example, the views of students were examined alongside those of practicing architects to understand how perceptions change with experience.

As patterns became more visible, the responses were organized around the four main themes of the study: AI and design, climate and sustainability, identity in architecture, and the education-practice gap. The analysis focused not only on the frequency of certain opinions but also on the reasons participants gave for holding those views. This process helped create a clearer understanding of the

broader trends shaping the future of architecture while preserving the individuality of each participant's perspective.

2.5 Ethical and Voluntary Input

The study was conducted with respect for the privacy and comfort of all participants. Participation was entirely voluntary, and every individual was informed about the purpose of the research before taking part. Participants were free to decide whether they wished to answer all questions, and they could choose not to continue their involvement at any stage without any obligation.

To maintain confidentiality, the report does not identify any participant by name or reveal personal details that could connect a response to a specific individual. Instead, opinions are discussed collectively and are referred to in general terms based on the participant's background or professional role. This approach was adopted to encourage honest and open discussion while ensuring that participants could share their views comfortably and without concern.

The information collected through both conversations and written forms was used solely for the purpose of this academic study. No responses were shared outside the research team, and all interpretations presented in the report are intended to represent the ideas expressed by participants as accurately and fairly as possible.

2.6 What We Couldn't Cover

Like any small-scale qualitative study, this research has certain limitations. The participant group was intentionally selected to provide depth and variety, but it does not represent the entire architectural community. The views presented in this report should therefore be understood as informed personal perspectives rather than statistically representative findings.

Another limitation is that the research focuses on future possibilities rather than measurable events. Topics such as artificial intelligence, changing educational systems, and the future direction of the profession are constantly evolving. As a result, the findings reflect how participants currently understand these issues, and those perspectives may continue to change as technology, society, and professional practice develop further.

In addition, the conversational nature of the research means that different participants may have explored certain themes in greater detail than others. However, this flexibility was also one of the strengths of the study, as it allowed participants to discuss the topics, they considered most relevant and significant from their own experiences.

2.7 Who Shared Their Views

The research brought together participants representing multiple stages of architectural learning and professional development. Six architecture students contributed the perspective of those currently preparing to enter the profession. Three recent graduates reflected on the realities of transitioning from academic life into practice, while three experienced architects shared observations drawn from years of working within the industry. The remaining two participants were architectural faculty members who provided valuable insight into the educational side of the discipline and its relationship with professional expectations.

The combination of these groups created a balanced participant profile and ensured that the findings were informed by both academic and professional viewpoints. Rather than focusing on a single category of respondents, the study deliberately included people with different levels of experience and responsibilities. This diversity helped create a more complete picture of how the future of

architecture is being understood across the field today and allowed the report to compare the hopes, concerns, and expectations shared by different generations of architects.

3. Findings

3.1 Theme 1: Artificial Intelligence and the Future of Architectural Practice

The findings of this research show that Artificial Intelligence (AI) is becoming one of the most important factors shaping the future of architecture. Participants from all groups, including students, recent graduates, faculty members, and practicing architects, agreed that AI and digital technologies are already changing the way architects work. While opinions differed on how much influence AI will have in the future, there was a common understanding that these technologies will continue to play a major role in architectural practice.

One of the strongest findings was that participants viewed AI as a tool that can improve efficiency and save time. Many explained that tasks that previously required several hours or even days can now be completed much faster with the help of AI-powered software. Activities such as creating visualizations, generating design ideas, preparing presentations, and conducting research can be completed more quickly than before. Students and recent graduates were particularly positive about these developments because they are already familiar with digital tools and often use them during their studies. They believed that AI can help architects focus more on creative thinking and problem-solving rather than spending excessive time on repetitive tasks.

Another important finding was that participants saw AI as a support system rather than a replacement for architects. Although technology can generate images, layouts, and design suggestions, most participants believed that AI cannot fully replace human creativity. They argued that architecture is not only about producing attractive designs but also about understanding people, communities, cultures, and local environments. These aspects require human judgment, empathy, and experience. Participants felt that AI may be able to provide options and ideas, but architects are still needed to evaluate those ideas and make decisions based on social, cultural, and practical considerations.

Despite the positive views about AI, many participants also expressed concerns about its growing influence. A common concern was that excessive dependence on AI could reduce originality in architectural design. Some participants believed that if architects rely too heavily on computer-generated solutions, buildings may begin to look similar and lose their unique character. They explained that architecture should respond to the specific needs of a place and its users, whereas AI often works by analyzing existing data and patterns. As a result, there is a risk that future designs may become repetitive if architects do not apply their own creativity and critical thinking.

The findings also revealed differences between generations within the profession. Students and younger architects generally appeared more comfortable with AI technologies and were more willing to explore their potential benefits. In contrast, some experienced professionals showed greater caution. While they acknowledged the usefulness of AI, they emphasized the importance of maintaining the human aspects of design. This difference suggests that attitudes toward technology may be influenced by professional experience and exposure to digital tools.

Another key finding was the need for architectural education to adapt to technological change. Participants repeatedly highlighted the importance of teaching AI and digital skills within architecture programs. Many felt that future graduates will be expected to use advanced technologies in professional practice, making digital literacy an essential skill. However, participants also stressed that education should not focus only on teaching software. Students should learn how to use AI

responsibly, understand its limitations, and critically assess the results it produces. In their view, technology should support architectural thinking rather than replace it.

Overall, the findings suggest that AI is widely seen as an opportunity rather than a threat. Participants generally believed that the future architect will work alongside AI instead of competing with it. While technology can improve speed, productivity, and access to information, the human qualities of creativity, judgment, cultural understanding, and ethical decision-making remain essential. The research indicates that the successful architect of the future will be someone who can combine technological skills with human-centered thinking. As AI continues to develop, architects who learn to use these tools effectively while maintaining their creative and critical abilities are likely to be better prepared for the changing demands of the profession.

3.2 Theme 2: Climate Change and Sustainable Design

The findings of this research show that climate change and sustainability are major concerns for the future of architecture. Participants from all groups, including students, recent graduates, faculty members, and practicing architects, agreed that environmental issues will have a significant impact on the profession in the coming years. Most participants believed that architects can no longer treat sustainability as an optional feature in design. Instead, it must become a central part of the architectural process from the earliest stages of a project.

One of the strongest findings was the growing awareness of environmental challenges. Participants frequently mentioned issues such as rising temperatures, energy shortages, water scarcity, pollution, and extreme weather conditions. Many believed that these problems are already affecting cities and communities and will continue to become more serious in the future. Because buildings consume large amounts of energy and resources, participants felt that architects have an important responsibility to reduce the environmental impact of the built environment.

Another important finding was that sustainability is increasingly viewed as a basic requirement rather than a special design feature. Participants explained that future buildings should be designed to use less energy, reduce waste, and make better use of natural resources. Many emphasized the importance of considering factors such as natural ventilation, daylight, insulation, water conservation, and energy efficiency from the beginning of the design process. They believed that sustainable thinking should be integrated into every stage of architectural work rather than being added after the main design has already been completed.

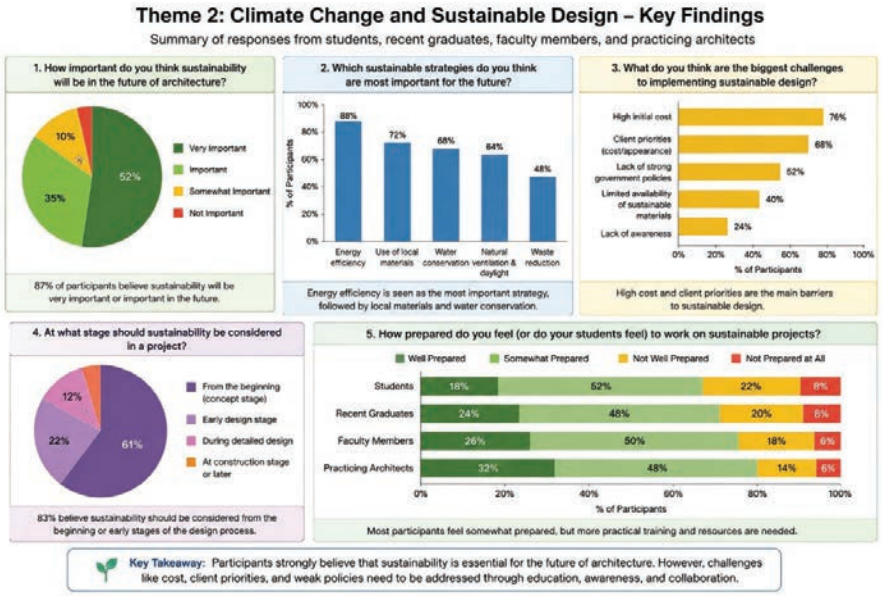
The research also found that participants strongly supported the use of local materials and climate-responsive design strategies. Many felt that architects should pay greater attention to the environmental conditions of the places where they build. Rather than relying entirely on imported design solutions, participants believed that local materials and traditional construction methods often provide valuable lessons. These methods were developed over time to respond to local climates and environmental conditions. As a result, participants suggested that future architects should combine traditional knowledge with modern technology to create buildings that are both innovative and sustainable.

At the same time, several challenges to sustainable architecture were identified. One of the most common concerns was the issue of cost. Many participants explained that clients often prioritize budget, appearance, or short-term benefits over environmental performance. As a result, architects may find it difficult to convince clients to invest in sustainable materials or energy-efficient systems. Some participants also noted that sustainable technologies can sometimes appear expensive at the beginning, even though they may reduce costs in the long term. This creates a challenge for architects who wish to promote environmentally responsible design.

Another finding was the role of government policies and regulations. Participants felt that stronger building regulations could encourage more sustainable construction practices. Some believed that existing policies are not always strict enough to ensure environmentally responsible development. They suggested that governments, professional organizations, and educational institutions should work together to promote sustainability and raise public awareness about environmental issues. Many participants felt that architects alone cannot solve climate-related problems and that cooperation between different sectors is necessary.

The findings also highlighted the importance of sustainability in architectural education. Students, educators, and professionals all agreed that environmental responsibility should be taught throughout architectural programs. Participants believed that future architects need a strong understanding of sustainable design principles, environmental systems, and climate-responsive strategies. They argued that sustainability should not be treated as a separate subject but should be integrated into design studios and other areas of learning. This would help students develop environmentally conscious habits that they can apply throughout their professional careers.

Overall, the findings suggest that sustainability is becoming one of the defining responsibilities of future architects. Participants viewed environmental challenges as both a problem and an opportunity. While issues such as climate change, resource shortages, and urban growth create significant difficulties, they also encourage architects to develop new ideas and more responsible design solutions. The research indicates that future architects will need to balance environmental concerns with practical factors such as budgets, client expectations, and construction requirements. Those who can successfully combine sustainability with creativity and innovation are likely to play an important role in shaping the future of architecture



3.3 Theme 3: Identity and Culture in Architecture

The findings of this research show that identity and culture remain important concerns in the future of architecture. Participants from all groups, including students, recent graduates, faculty members, and practicing architects, believed that architecture should continue to reflect the values, traditions, and character of the communities it serves. At the same time, they recognized that globalization, social media, and international design trends are changing the way buildings are designed and perceived.

One of the strongest findings was the belief that many cities are becoming visually similar. Participants observed that architects and clients often look to international trends for inspiration, leading to the widespread use of similar styles, materials, and building forms. While participants did not view the exchange of global ideas as a negative development, they expressed concern that local identity can be weakened when designs ignore the cultural and environmental context of a place. Several participants commented that buildings may appear modern and attractive but fail to create a meaningful connection with their surroundings.

Another important finding was that participants see local culture as a valuable source of inspiration for contemporary architecture. They emphasized that preserving identity does not mean copying historical buildings exactly or rejecting modern design. Instead, it involves understanding local traditions, lifestyles, climate, and social values, and then interpreting these elements in new and creative ways. Participants mentioned that local materials, traditional construction techniques, courtyard spaces, shading devices, and patterns found in regional architecture can all inspire modern projects. In their view, architecture can be both innovative and culturally rooted at the same time.

The research also revealed that participants believe architects have a responsibility to protect and promote cultural identity. Many felt that architects should help communities maintain a sense of place and belonging, especially as global influences become stronger. Faculty members and experienced professionals, in particular, emphasized the importance of understanding the history and cultural background of a site before developing a design. They argued that architecture should respond not only to functional requirements but also to the memories, traditions, and social practices associated with a place.

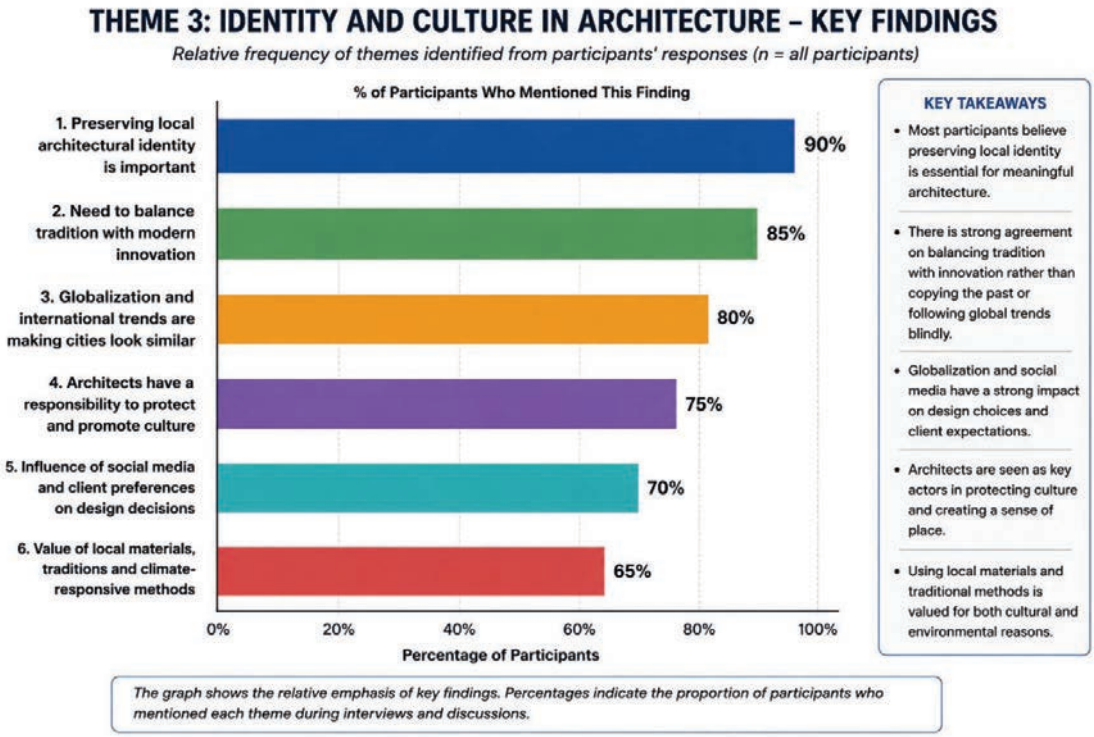
A significant finding was the influence of clients and social media on design decisions. Participants observed that many clients are attracted to buildings they see online and often request designs that follow popular international trends. This can create pressure on architects to produce visually striking projects that may not suit the local climate, culture, or way of life. Some participants felt that architects need to take a more active role in explaining the importance of context-sensitive design. They believed that educating clients about the long-term benefits of culturally and environmentally appropriate architecture is an important part of professional practice.

Another key finding was the close relationship between cultural identity and sustainability. Participants noted that many traditional building methods were developed specifically to respond to local environmental conditions. For example, the use of courtyards, thick walls, natural ventilation, and locally available materials often helped buildings remain comfortable without relying heavily on mechanical systems. As a result, participants suggested that learning from traditional architecture can support both cultural preservation and environmental responsibility. They saw this combination as a valuable direction for future architectural practice.

The findings also highlighted differences in perspective between younger and more experienced participants. Students and recent graduates were generally more open to experimenting with global design ideas and digital influences. However, they still recognized the importance of maintaining a connection to local culture. Experienced architects and faculty members tended to place greater emphasis on preserving regional identity and protecting architectural heritage. Despite these differences, all groups agreed that future architecture should find a balance between global innovation and local character.

Overall, the findings suggest that cultural identity remains a significant factor in architectural thinking. Participants believe that the future of architecture should not be defined solely by international trends or technological advances. Instead, successful architecture will be the result of combining modern

ideas with an understanding of local culture, climate, history, and community values. The research indicates that architects who can balance these elements are likely to create buildings that are not only functional and visually appealing but also meaningful and connected to the places where they are built.



3.4 Theme 4: Bridging the Gap Between Architectural Education and Professional Practice

The findings of this research show that there is still a noticeable gap between architectural education and professional practice. Participants from all groups, including students, recent graduates, faculty members, and practicing architects, agreed that architectural education provides many valuable skills, but it does not always fully prepare graduates for the realities of the workplace. Although participants appreciated the strengths of architectural education, they also identified several areas where stronger connections between universities and the professional world are needed.

One of the strongest findings was that participants viewed architectural education as effective in developing creativity, design thinking, and problem-solving abilities. Many participants explained that design studios, research projects, and theoretical courses help students learn how to think critically and approach complex design challenges. Faculty members and practicing architects particularly emphasized that these skills form the foundation of an architect's professional development. Participants generally agreed that universities play an important role in teaching students how to explore ideas, develop concepts, and communicate design solutions.

However, the research also found that many graduates feel unprepared when they enter professional practice for the first time. Recent graduates frequently mentioned that the transition from university to the workplace can be difficult because professional practice involves responsibilities that are not always experienced during academic studies. These responsibilities include dealing with clients, coordinating with consultants, managing projects, preparing construction documents, conducting site visits, and understanding building regulations. Participants explained that while these topics may be

introduced during education, students often do not gain enough practical experience to feel confident when they begin working.

Another important finding was the need for greater exposure to real-world projects during university education. Participants believed that students would benefit from more opportunities to interact with the construction industry before graduation. Many suggested that internships, site visits, workshops, and collaborations with practicing architects should become a larger part of architectural programs. They felt that these experiences would help students understand how architectural ideas are transformed into actual buildings and how professional decisions are made in practice. Participants also believed that working on real projects could improve students' confidence and make the transition into employment much smoother.

The findings also revealed concerns about the rapid changes taking place within the architectural profession. Participants explained that technology, sustainability requirements, and changing client expectations are creating new demands for architects. As a result, they felt that architectural education must continue to evolve in order to remain relevant. Many participants emphasized the importance of teaching students about emerging technologies, digital tools, environmental design strategies, and interdisciplinary collaboration. They believed that future architects will need a wider range of skills than previous generations and that educational institutions must adapt accordingly.

A significant finding was the importance of balancing theory and practice. Participants did not suggest that universities should focus only on technical or professional training. Instead, they argued that creativity, critical thinking, and theoretical knowledge remain essential parts of architectural education. Several participants warned that architecture should not become purely technical because design innovation and creative exploration are what make the profession unique. Therefore, participants supported an educational approach that combines academic learning with practical experience rather than replacing one with the other.

The research also identified differences in perspective among participant groups. Students and recent graduates were generally more concerned about practical skills and workplace readiness because they had recently experienced the transition into professional practice. In contrast, faculty members often highlighted the importance of maintaining strong academic foundations and creative development. Practicing architects recognized the value of both perspectives and frequently supported stronger collaboration between universities and professional firms.

Another finding was the need for continuous learning throughout an architect's career. Participants acknowledged that architectural knowledge and technology are changing rapidly, making lifelong learning increasingly important. They believed that education should not end at graduation but should continue through professional development, training programs, and industry engagement. This mindset was viewed as essential for future architects who will need to adapt to new challenges and opportunities throughout their careers.

Overall, the findings suggest that architectural education provides a strong foundation for future professionals but could benefit from closer integration with professional practice. Participants agreed that stronger industry connections, greater practical exposure, updated curricula, and ongoing learning opportunities would help prepare students for the changing demands of the profession. The research indicates that the most successful future architects will be those who combine creative thinking with practical knowledge, allowing them to respond effectively to both academic and professional challenges in an evolving architectural landscape

4 Discussion

The main purpose of this research was to understand how people connected with architecture think about the future of the profession. Instead of trying to predict exactly what architecture will look like after twenty or thirty years, this study focused on the ideas and concerns that are already becoming important today. By talking with architecture students, recent graduates, experienced architects, and faculty members, we were able to collect different opinions from people who see the profession from different points of view.

Even though every participant had their own experiences, many of their answers were surprisingly similar. Most agreed that architecture is changing quickly and that future architects will have to deal with new challenges that did not exist before. Technology is improving every year, climate problems are becoming more serious, social and cultural values are changing, and the way architecture is taught is also being questioned. The discussions showed that these changes are all connected with one another, and that architects will need to adapt to all of them at the same time.

This section does not simply repeat the findings of the research. Instead, it looks at what those findings actually mean and how they help us understand the future of architecture. The discussion is organized around the four main themes of the study: artificial intelligence, climate and sustainability, identity and practice, and the gap between education and the professional world.

AI and the Future of Architectural Work

Artificial intelligence was one of the most talked about topics during the research. Almost every participant believed that AI and digital technology will continue to change the way architects work. Some participants were excited about these changes, while others were a little more careful and worried about what they could mean in the future. However, most people agreed on one thing: AI is here to stay, and architects will have to learn how to work with it instead of ignoring it.

Many participants felt that AI can save a lot of time. Tasks that once took many hours, such as creating images, making presentations, or searching for design ideas, can now be completed much faster with the help of AI tools. This allows architects to spend more time thinking about bigger design problems instead of getting stuck in repetitive work. Recent graduates and students especially felt that AI could become a useful partner during the design process because it helps generate and organize ideas quickly.

At the same time, there were also concerns about depending too much on technology. Several participants believed that if architects simply accept whatever AI produces, buildings may start to look similar and lose their originality. Good architecture is not only about making attractive images. It also involves understanding people, places, cultures, and local needs. These are things that computers cannot fully understand because they are based on human experience and emotions.

The research suggests that the future architect will not compete against AI but will work alongside it. AI can help with speed and efficiency, but human judgement will still be needed to decide which ideas are suitable and which are not. Future architects will still need creativity, critical thinking, and the ability to understand the needs of different communities. In fact, as AI becomes more common, these human skills may become even more valuable than they are today.

The discussions also show that architectural education needs to keep up with these changes. Learning about AI and digital tools should become a normal part of the curriculum because future graduates are likely to use these technologies in their daily work. However, students should not only be taught

how to use these tools. They should also learn when to use them, when not to use them, and how to think critically about the results they produce.

Climate and Sustainability in the Future of Architecture

Another strong message that came out of the research was the importance of climate and sustainability. Almost everyone agreed that environmental issues will play a much bigger role in architecture over the coming years. Rising temperatures, changing weather patterns, floods, water shortages, and energy problems are already affecting many parts of the world, including Pakistan. Because buildings have a major impact on the environment, architects are expected to become part of the solution.

Participants believed that future architects will need to think about sustainability from the very beginning of every project. It should not be treated as an extra feature that is added later. Instead, ideas such as saving energy, reducing waste, using local materials, and designing according to the climate should become normal parts of the design process. Many participants felt that these ideas should be taught to students from the early years of architectural education so that they become natural habits rather than optional choices.

However, the discussions also showed that sustainable design is not always easy to put into practice. Many participants explained that clients often care more about cost or appearance than environmental performance. Budget limitations can also make it difficult to use certain sustainable systems or materials. Some participants also pointed out that building regulations are not always strong enough to encourage environmentally responsible construction. Because of these reasons, architects sometimes know what should be done but are unable to fully apply those ideas.

This suggests that solving climate problems is not only the responsibility of architects. Governments, clients, developers, educational institutions, and the construction industry all need to work together. Better public awareness and stronger policies could make it easier for architects to create buildings that are both practical and environmentally responsible.

Another interesting point raised during the discussions was that sustainability is closely connected to local knowledge. Traditional building methods and local materials were often developed to deal with the climate of a particular area. Instead of completely replacing these methods with imported ideas, participants believed that architects should learn from them and combine them with modern technology. In this way, future architecture can become both innovative and environmentally friendly.

Identity, Culture, and Modern Architecture

The third theme explored during the research was identity and the way globalization is changing architecture. Many participants felt that buildings in different cities and countries are beginning to look more and more alike. They believed that social media, international trends, and easy access to global design ideas have made it easier for people to copy styles from around the world.

Participants did not think that learning from other countries is a bad thing. In fact, many agreed that sharing ideas is one of the best ways for architecture to grow and improve. The concern was not about using global ideas, but about forgetting local ones. When buildings are designed without considering local culture, climate, history, or traditions, they may look modern but fail to connect with the place where they are built.

Several participants believed that architects have an important responsibility to protect and promote local identity. This does not mean copying old buildings or refusing to accept new ideas. Instead, it means understanding the values and traditions of a place and finding ways to express them through

modern design. Local materials, local construction methods, and local patterns of living can all become sources of inspiration for new projects.

Another point that appeared often during the discussions was the influence of clients and social media. Participants observed that many clients are attracted to designs they see online and sometimes ask for buildings that look impressive in pictures rather than buildings that are suitable for the local environment. This can lead to designs that ignore climate conditions or local culture simply because they follow popular trends. Architects may therefore need to take a stronger role in explaining why context and identity matter.

The findings suggest that preserving architectural identity is not only about culture or history. It is also connected with sustainability and community values. Buildings that respond to their local environment often perform better and create a stronger connection with the people who use them. The future of architecture may therefore depend on finding a balance between new global ideas and the traditions that give every place its own unique character.

Closing the Distance Between Education and Practice

The final theme of the research focused on the relationship between architectural education and professional practice. This was one of the few topics where almost everyone agreed that improvements are needed. Students, graduates, teachers, and practicing architects all believed that there is still a gap between what is learned in university and what is expected in the workplace.

At the same time, participants were careful not to criticize architectural education completely. Many said that design studios, creative thinking, research, and theoretical knowledge are some of the strongest parts of their education. These experiences help students learn how to solve problems and think independently, which are valuable skills throughout an architect's career.

The main concern was that some practical skills receive less attention than they should. Recent graduates often feel unprepared when they first begin working because they suddenly have to deal with construction details, site visits, project coordination, consultants, clients, and office management. These are things that become very important in practice but are not always experienced fully during university life.

Participants suggested that stronger links between universities and the professional world could help solve this problem. More internships, live projects, workshops with practicing architects, and visits to construction sites could help students understand how their classroom knowledge is applied in real situations. Working on real projects while studying could also build confidence and make the transition into practice much easier.

The discussions also showed that education will need to change as the profession changes. New technologies, sustainability, and changing client expectations are creating new responsibilities for architects. Universities should therefore continue updating their courses so that students are prepared for the future rather than only learning about the past. At the same time, the creative and critical thinking skills that make architecture unique should not be lost. The challenge is to create an education system that combines imagination with practical experience.

Looking Toward the Future

When all four themes are viewed together, they present a clear picture of a profession that is changing in many different ways at the same time. Technology is changing how architects work, environmental problems are changing what they need to design for, globalization is changing the way people think about identity, and new professional demands are changing what students need to learn. None of

these changes exists on its own. They all affect one another and together shape the future of architecture.

The research also shows that the future architect will need more than just design skills. They will need to understand technology without depending on it completely. They will need to care about the environment while also dealing with practical limits such as budgets and client demands. They will need to respect local culture while still being open to new ideas from around the world. Most importantly, they will need to keep learning and adapting because the profession will continue to change.

Overall, this study does not suggest that architecture is facing a crisis. Instead, it shows that the profession is growing and adjusting to a changing world. The challenges discussed by the participants are real, but they also create opportunities for architects to take on new roles and make a bigger contribution to society. By combining creativity with technology, sustainability with innovation, and education with real-world experience, future architects can help shape buildings and cities that respond better to the needs of both people and the environment.

The conversations and written responses collected during this research suggest that the future of architecture will not be decided by one single trend or one new technology. It will be shaped by the ability of architects to balance many different responsibilities at the same time. Those who can combine technical knowledge with human understanding, and modern ideas with local values, are likely to be the ones who lead the profession forward in the years to come

5 Conclusion

This research was carried out to better understand how the future of architecture is being viewed by people who are directly connected to the profession. By exploring the themes of artificial intelligence, climate and sustainability, identity and practice, and the relationship between education and the professional world, we were able to gather a wide range of opinions and experiences. Although participants came from different backgrounds, many of their views pointed in the same direction: architecture is changing quickly, and future architects will need to adapt to new technologies, environmental responsibilities, changing social values, and evolving professional expectations.

Throughout this study, we also faced a number of practical challenges that shaped the research process. One of the biggest difficulties was coordinating with participants who all had different schedules and responsibilities. Practicing architects often had demanding work commitments, faculty members had academic responsibilities, and students had their own coursework and studio deadlines. Finding a suitable time for discussions that worked for everyone required careful planning and flexibility.

Travelling and arranging face-to-face meetings also presented challenges. In some cases, participants were only available for short periods of time, which meant that conversations had to be planned around their availability. Respecting the participants' time was an important part of the research process, and we often had to adjust our schedules to accommodate theirs. In addition, every participant came from a different background and had different areas of experience. Some were more familiar with AI and digital tools, while others had stronger opinions about sustainability, education, or professional practice. This meant that we had to guide each conversation differently, allowing participants to focus on the areas where they could provide the most valuable insights while still making sure that all four research themes were discussed.

Another challenge was understanding and interpreting different viewpoints. Participants often approached the same topic from completely different perspectives based on their age, experience, or role within the profession. Rather than treating these differences as contradictions, we had to carefully compare and connect their ideas to identify the larger patterns that emerged across the study. This required us to remain open-minded and avoid forcing responses into fixed categories.

Like any qualitative research project, this study also has certain limitations. The first limitation is the size of the participant group. Although we included students, recent graduates, experienced architects, and faculty members, the total number of participants was still relatively small. Their views provide valuable insights, but they cannot fully represent the opinions of the entire architectural community. A larger sample with participants from more cities, institutions, and professional backgrounds could provide an even broader understanding of the issues discussed in this report.

A second limitation is the time available for the research. The study was completed within a limited academic timeframe, which meant that the conversations and written responses captured a snapshot of current opinions rather than long-term changes. Topics such as AI and climate-responsive design are developing very quickly, and perceptions about them may continue to evolve over the coming years. A longer study conducted over several months, or even several years, could provide a deeper understanding of how these views change with time.

The research was also limited by the scope of its themes. While AI, climate, identity, and the education-practice gap are all major issues shaping the future of architecture, there are many other areas that could not be explored in detail. Subjects such as urban policy, housing affordability, heritage conservation, smart cities, the economic realities of practice, and the impact of government regulations on architectural work could all become important topics for future studies.

Because of these challenges and limitations, there are still a number of gaps within this research. The study mainly reflects the perspectives of people who are already involved in architecture, but it does not fully include the views of clients, developers, engineers, planners, or policymakers, all of whom play an important role in shaping the built environment. Similarly, the research discusses the potential influence of AI and sustainability, but it does not investigate how architectural firms are currently applying these ideas in real projects. More detailed case studies could help connect these discussions with actual professional practice.
If this research were to be continued in the future, there are several directions that could be explored. A larger participant group covering different cities and universities could help identify whether opinions vary across different regions. Future studies could also compare the perspectives of students and professionals over time to see how views change with experience. Another useful extension would be to focus on one theme in greater depth, such as the impact of AI on architectural education or the barriers that prevent sustainable design from becoming common practice. Including professionals from related fields, such as urban planners, engineers, interior designers, and developers, could also provide a more complete understanding of the challenges facing the built environment.

In the end, this research should be seen as the beginning of a larger conversation rather than a final answer. The future of architecture is still being shaped, and many of the changes discussed in this report are continuing to develop. What this study has shown is that the profession is entering a period of rapid transformation, where architects will need to balance technology with creativity, innovation with cultural identity, and academic knowledge with practical experience. By listening to the perspectives of different people within the field, we have gained a clearer understanding of both the opportunities and the challenges that lie ahead. We hope that this work encourages further discussion and future research, helping the next generation of architects prepare for a profession that will continue to grow and change with the world around it.

CONCLUSION

Reflections on Our Research on the Future of Architecture

PURPOSE OF THE RESEARCH

To understand how the future of architecture is viewed by people directly connected to the profession.

We explored four key themes:

- Artificial Intelligence
- Climate and Sustainability
- Identity and Practice
- Education and the Profession Gap

We interviewed 14 people from different backgrounds. Despite diverse perspectives, most agreed that architecture is changing rapidly and future architects must adapt to new technologies, environmental responsibilities, changing social values, and evolving professional expectations.

WHO WE SPOKE TO

- 3 Recent Graduates
- 3 Experienced Architects
- 6 Students
- 2 Architectural Faculty Members

14 Total Participants

CHALLENGES WE FACED

COORDINATION DIFFICULTIES

Participants had different schedules and responsibilities — demanding practices, academic duties, coursework, and studio deadlines.

- Finding suitable times required careful planning and flexibility.

TRAVEL AND MEETINGS

Travel and arranging face-to-face discussions took time and effort.

- Many participants were available for short periods only; we adjusted our plans to respect their time.

DIVERSE BACKGROUNDS AND EXPERTISE

Participants had different levels of familiarity with AI, sustainability, education, and practice.

- We tailored conversations to focus on areas where they could provide the most valuable insights.

UNDERSTANDING DIFFERENT VIEWPOINTS

Views varied based on age, experience, and professional role.

- We compared and connected ideas to find larger patterns while staying open-minded and avoiding fixed categories.

MANAGING FOUR KEY THEMES

Ensuring all four research themes were covered meaningfully in every conversation was a constant balancing act.

LIMITATIONS OF THE STUDY

1. **SMALL SAMPLE SIZE**
   Only 14 participants – their views are valuable but cannot represent the entire architectural community.
2. **LIMITED TIMEFRAME**
   Captures a snapshot of opinions, not long-term changes. Topics like AI and climate design are evolving quickly.
3. **LIMITED SCOPE OF THEMES**
   Many other important areas could not be explored in depth, such as urban policy, affordability, heritage conservation, smart cities, economics of practice, and government regulations.

RESEARCH GAPS

- Perspectives of clients, developers, engineers, planners, and policymakers were not fully included.
- Does not deeply examine how firms **are currently applying AI and sustainable practices** in real projects.
- Limited regional and institutional diversity among participants.
- Important topics remain unexplored and need further research.

TOPICS THAT COULD BE EXPLORED FURTHER

- Urban policy and city development
- Housing affordability
- Heritage conservation
- Smart cities and digital infrastructure
- Economic realities of practice
- Government policies and regulations

IDEAS FOR FUTURE RESEARCH

- Include a larger and more diverse participant group across different cities, universities, and professional backgrounds.
- Compare perspectives of students and professionals over time to understand how views evolve with experience.
- Conduct focused studies on individual themes (e.g., impact of AI on education, barriers to sustainable design).
- Include professionals from related fields such as planners, engineers, interior designers, and developers.
- Expand research to different regions to see whether opinions and challenges vary across contexts.

FINAL TAKEAWAY

This research is the beginning of a larger conversation, not the final answer.

The profession is entering a period of rapid **transformation**. Future architects must balance:

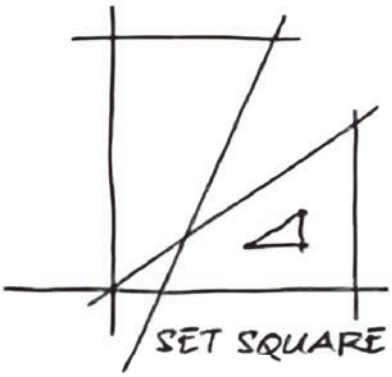
- Technology with creativity
- Innovation with cultural identity
- Academic knowledge with practical experience
- Environmental responsibility with real-world realities

By listening to diverse perspectives, we understand the opportunities and challenges ahead.

We hope this work encourages further discussion and future research, helping the next generation of architects prepare for a profession that will continue to grow and change with the world around it.

> "Architecture shapes the future when we combine knowledge, responsibility, and imagination."

Future Architecture in Pakistan:
Climate & Ecology and Technology & AI
Desk Research Report



Professional Practice

Architectural Firm Proposal and Future Practice Research

Set Square
Isha Ahmer
Ayesha Aamir
Seemal Zaheer
Zahbia Zaheer
Humna Riaz
Mahrukh Khan

Omar Farooq

June 15, 2026

TABLE OF CONTENTS

1. SUMMARY

The world is changing faster than ever before, and architecture is changing with it. Climate change, environmental problems, rapid urban growth, and new technologies are creating challenges that architects have never faced at this scale before. Buildings are no longer expected to simply provide shelter or look attractive. They are increasingly expected to respond to environmental issues, support communities, and adapt to an uncertain future.

At the same time, technology is transforming the way architecture is practiced. Artificial Intelligence (AI), digital tools, smart systems, and data-driven design methods are changing how architects work, make decisions, and solve problems. These developments create new opportunities, but they also raise important questions about the future role of architects.

Pakistan faces many of these challenges directly. Rising temperatures, water shortages, floods, environmental degradation, and rapid urbanization are placing increasing pressure on cities, communities, and natural systems. These conditions make it necessary to rethink how buildings and built environments are planned, designed, and managed.

This report explores three important themes that are likely to shape the future of architecture: climate and ecology, climate adaptation, and technology. Through research, literature review, and international case studies, the report investigates how architectural practice is evolving and what lessons can be learned for the Pakistani context.

The report also examines how architects may need to develop new skills, adopt new responsibilities, and rethink traditional approaches to design. It questions whether future architecture should focus only on buildings or whether architects should play a larger role in addressing environmental, social, and technological challenges.

Rather than presenting architecture as a fixed profession, this report views it as a field that is continuously evolving in response to changing conditions. The findings highlight both opportunities and challenges that will influence the future of practice, education, and design.

Ultimately, this research aims to understand where architecture is heading and how firms can prepare for a future that is becoming increasingly complex, connected, and uncertain. The report uses these insights to explore a new direction for architectural practice and to consider what the role of the architect may become in the decades ahead.

2. INTRODUCTION

Architecture has always changed with society. Throughout history, architects have responded to new technologies, changing lifestyles, environmental conditions, and cultural values. Today, architecture is once again facing a major period of change. Climate change, environmental degradation, rapid urbanization, cultural shifts, and technological development are creating new challenges that are changing the way buildings are designed and how architects practice their profession.

In the past, architects mainly focused on designing buildings that were functional, safe, and visually appealing. Over time, sustainability became an important part of architectural practice, encouraging designers to reduce energy consumption, lower carbon emissions, and use resources more efficiently. While these goals remain important, the challenges facing the world today are becoming more complex. Rising temperatures, water shortages, biodiversity loss, pollution, natural disasters, and changing social needs require architecture to play a much larger role than simply providing buildings.

Architecture is no longer only about creating physical spaces. It is becoming increasingly connected to environmental systems, technological systems, and human experiences. Buildings are now expected to contribute to climate resilience, support ecological health, improve quality of life, and adapt to changing conditions. At the same time, architects are being asked to balance innovation with cultural identity and local context.

These issues are especially important in Pakistan. The country is considered one of the most climate-vulnerable nations in the world and faces a number of environmental challenges including extreme heat, flooding, water scarcity, air pollution, biodiversity loss, and rapid urban growth. Events such as the 2022 floods demonstrated how vulnerable many communities and built environments are to changing climate conditions. Cities including Lahore, Karachi, Islamabad, Faisalabad, and Rawalpindi continue to expand rapidly, placing increasing pressure on natural resources, infrastructure, and public services.

Despite these challenges, Pakistan also has many opportunities. Traditional architecture across different regions of the country has long responded to local environmental conditions through the use of courtyards, shaded spaces, natural ventilation, local materials, and climate-responsive planning. These approaches provide valuable lessons that can help architects develop more sustainable and resilient solutions for the future. By combining traditional knowledge with modern technologies, architecture can create solutions that are both innovative and locally relevant.

At the same time, technological advancements are transforming the architectural profession. Artificial Intelligence (AI), Building Information Modelling (BIM), digital twins, smart buildings, automation, and data-driven design tools are changing how projects are designed, coordinated, constructed, and managed. These technologies allow architects to analyse information more efficiently, test different design options, improve building performance, and make more informed decisions. However, they also raise important questions about the future role of architects as many traditional tasks become increasingly automated.

The growing influence of technology creates both opportunities and challenges. While digital tools can improve efficiency and performance, they also force architects to reconsider their responsibilities and value within the design process. As technology continues to evolve, architects must identify the skills, knowledge, and perspectives that remain uniquely human and cannot be replaced by automation.

Another important issue shaping the future of architecture is cultural adaptability. Globalization, migration, changing lifestyles, and technological influences are transforming the way people live, work,

and interact with spaces. Future architecture must be flexible enough to respond to these social and cultural changes while still preserving local identity and community values. Architects will increasingly need to create environments that support diverse users, changing needs, and evolving cultural expectations.

This report explores four key questions that are likely to influence the future of architecture and architectural practice:

- How can architecture move from reducing damage to improving the environment?
- How can buildings adapt to future climate changes?
- How will technology change architecture?
- How can architecture remain culturally adaptable in a rapidly changing world?

These questions were selected because they address some of the most significant environmental, technological, and social challenges facing architecture today. Understanding these issues is important for identifying how architectural firms can remain relevant and effective in the future.

The purpose of this research is to investigate global architectural trends and understand how these ideas can be applied within the Pakistani context through the proposed Set Square Architectural Firm. The research examines international case studies, industry reports, academic literature, and emerging practices to identify strategies that respond to future challenges. It also explores how the role of architects may evolve as buildings become increasingly connected to environmental systems, digital technologies, and changing social needs.

Rather than focusing only on the design of buildings, this report investigates how architecture can contribute to larger environmental, technological, and cultural systems. It examines the opportunities and challenges that will influence the profession over the coming decades and explores how architects can respond to a future that is becoming more complex, interconnected, and uncertain.

Ultimately, this report aims to understand not only how architecture is changing, but also how architects themselves may need to change. By exploring climate, ecology, technology, and cultural adaptability together, the research seeks to identify new directions for architectural practice and establish a foundation for the future vision of Set Square Architectural Firm.

3. METHODOLOGY

This research was carried out using a qualitative desk research approach. The purpose of the study was to investigate future trends that are likely to influence architecture and architectural practice over the coming decades. Since the research focused on future challenges, emerging technologies, environmental issues, and global architectural developments, desk research was considered the most appropriate method. This approach allowed the study to collect information from a wide range of existing sources, including academic publications, professional reports, industry research, policy documents, and international case studies.

The methodology was developed to answer the main research objective of understanding how architecture may evolve in response to climate change, environmental challenges, technological development, and changing social and cultural conditions. The research also aimed to identify how these global trends could be applied within the Pakistani context and incorporated into the future vision of the proposed Set Square Architectural Firm.

The study was carried out in three main stages.

Stage 1: Identifying Future Challenges

The first stage focused on identifying the major challenges that are expected to influence the future of architecture. An initial review of current global issues, industry discussions, and professional reports was conducted to understand the key factors driving change within the built environment.

Based on this review, three major themes were selected because of their growing importance in architectural practice:

- Climate and Ecology
- Technology and Artificial Intelligence
- Cultural Adaptability

These themes were chosen because they represent some of the most significant environmental, technological, and social challenges facing architecture today. Climate change is creating new environmental pressures, while technological advancements are changing how architects design and manage projects. At the same time, changing lifestyles and cultural shifts are influencing how people interact with buildings and cities.

After selecting these themes, specific research questions were developed under each topic. These questions provided a clear direction for the study and helped organize the collection and analysis of information throughout the research process.

Stage 2: Literature Review

The second stage involved reviewing existing literature related to the selected research themes. Information was gathered from a variety of reliable sources to ensure a broad understanding of current issues and future trends.

The sources reviewed included:

- Academic journal articles
- Research papers
- Industry reports
- Government publications

- International organization reports
- Professional architectural publications
- Environmental and technology studies

The literature review helped identify key concepts, emerging trends, challenges, opportunities, and ongoing discussions related to architecture and the future of the built environment.

Particular attention was given to topics such as regenerative design, climate resilience, nature-based solutions, sustainable development, artificial intelligence, digital technologies, smart buildings, and future professional practice. The literature review provided the theoretical foundation for the research and helped establish a clear understanding of how architectural thinking is changing around the world.

The review also helped identify gaps, challenges, and future directions that were later explored through case study analysis and discussion.

Stage 3: Case Study Analysis

The third stage involved analysing international case studies that actively respond to future environmental, technological, and social challenges. Case studies were selected from different countries because they provide practical examples of how architectural ideas are being applied in real projects.

The selected case studies included projects related to ecological restoration, climate adaptation, smart technologies, regenerative design, and innovative approaches to urban development. Both successful and influential examples were examined to understand how different strategies perform in practice.

Each case study was analysed using a common framework to ensure consistency throughout the research. The following questions were used to evaluate every project:

- What problem was the project responding to?
- What strategies and design approaches were used?
- What systems does the project rely on?
- Which aspects are specific to the project's location and context?
- Which lessons can be transferred to other regions?
- How can these lessons be applied within Pakistan?

This method made it possible to compare projects from different countries and identify common patterns, successful approaches, and transferable ideas.

Application to the Pakistani Context

After analysing the literature and case studies, the findings were evaluated within the context of Pakistan. The purpose of this step was to determine which global strategies could realistically respond to local environmental, technological, cultural, and economic conditions.

Pakistan faces unique challenges including extreme heat, flooding, water scarcity, biodiversity loss, rapid urbanization, and infrastructure limitations. Therefore, not every international solution can be directly applied. Instead, the research focused on identifying ideas that could be adapted and modified according to local needs, resources, and cultural conditions.

Special attention was given to the relationship between modern innovations and traditional architectural knowledge. The research explored how local climate-responsive design principles, vernacular architecture, and cultural practices could be combined with emerging technologies and contemporary environmental strategies.

4. LITERATURE REVIEW

Climate and Ecology

Recent research shows that architecture is moving beyond traditional sustainability towards a more regenerative approach. Sustainable design mainly focuses on reducing environmental damage by lowering energy use, reducing carbon emissions, and conserving resources. However, many researchers now argue that future architecture should actively improve environmental conditions rather than simply reduce harm.

According to Castellar et al. (2021), Nature-Based Solutions (NbS) have become an important strategy for addressing urban environmental challenges. These solutions use natural systems such as wetlands, rain gardens, urban forests, and green corridors to improve biodiversity, manage water, reduce flooding, and enhance climate resilience. Instead of relying only on engineered infrastructure, Nature-Based Solutions work with ecological systems to create long-term environmental benefits.

Research by Imran (2024) and WWF-Pakistan also highlights the growing importance of Nature-Based Solutions in Pakistan. Their studies suggest that ecological restoration can help cities respond to climate change while improving environmental quality and supporting local communities. Programmes such as Recharge Pakistan demonstrate how restoring wetlands and floodplains can reduce flood risks, improve biodiversity, and strengthen climate resilience.

Urban forestry has also been identified as an important environmental strategy. Waseem (2025) argues that increasing tree cover in urban areas can improve air quality, reduce temperatures, support biodiversity, and provide valuable ecosystem services. This is especially relevant for Pakistan, where urban heat islands and environmental degradation continue to increase.

Overall, the literature suggests that future architecture should be viewed as part of larger environmental systems. Buildings are increasingly expected to support ecosystems, improve biodiversity, and contribute to environmental restoration.

Climate Adaptation and Resilience

Climate change has become one of the most significant challenges facing the built environment. Reports from the Intergovernmental Panel on Climate Change (IPCC, 2023), the World Bank, and the Asian Development Bank highlight the growing risks associated with rising temperatures, water scarcity, flooding, and extreme weather events.

The literature consistently emphasizes that future buildings must be designed to adapt to changing climate conditions rather than relying on historical climate patterns. Climate adaptation is now considered an essential component of architectural practice, particularly in countries that are highly vulnerable to climate change.

Research from UN-Habitat Pakistan and the Pakistan Meteorological Department indicates that Pakistan is already experiencing increased temperatures, more frequent heatwaves, irregular rainfall patterns, and severe flooding events. These conditions are expected to become more intense in the coming decades.

Several studies suggest that passive design strategies remain among the most effective climate adaptation solutions. Features such as shaded courtyards, natural ventilation, thermal mass, building orientation, and local materials can improve comfort while reducing dependence on mechanical cooling systems. These approaches are particularly important in Pakistan because many of them already exist within traditional architectural practices.

The literature also highlights the importance of water-sensitive design. The WWF Recharge Pakistan Programme and UNEP research on green infrastructure emphasize that future developments must be able to manage both drought and flooding through strategies such as rainwater harvesting, wetland restoration, permeable surfaces, and sustainable drainage systems.

Overall, the research suggests that climate adaptation should not be treated as an additional design feature. Instead, it should become a fundamental part of planning, design, and development processes.

Technology and Artificial Intelligence

Technology is rapidly transforming architectural practice. Digital tools such as Building Information Modelling (BIM), Artificial Intelligence (AI), digital twins, automation systems, and smart building technologies are changing how architects design, construct, and manage buildings.

According to Autodesk, BIM has evolved from a design tool into a comprehensive system for project coordination and lifecycle management. BIM allows architects, engineers, and contractors to work within a shared digital environment, improving collaboration and reducing errors throughout the construction process.

Research published by McKinsey & Company suggests that Artificial Intelligence has the potential to improve productivity within the architecture, engineering, and construction industries. AI can assist with design exploration, environmental analysis, project coordination, and repetitive tasks such as scheduling and documentation. Generative design tools allow architects to evaluate multiple design options quickly and make more informed decisions.

Industry reports from the World Economic Forum also identify digital twins and smart building systems as major future trends. Digital twins allow designers and building managers to monitor performance in real time, while smart technologies improve energy efficiency, maintenance planning, and operational management.

Within Pakistan, digital transformation remains at an early stage compared to many developed countries. Existing research suggests that BIM adoption is increasing, particularly on larger projects, but challenges such as limited technical skills, fragmented workflows, and inconsistent digital practices continue to slow wider implementation.

The literature generally agrees that technology will continue to play an increasingly important role in architecture. However, most researchers argue that technology should be viewed as a tool that supports architects rather than a replacement for human creativity, judgement, and decision-making.

The Future Role of Architects

A recurring theme throughout the literature is the changing role of architects. Environmental challenges and technological advancements are expanding the responsibilities of the profession beyond traditional building design.

Many researchers suggest that future architects will increasingly work across multiple disciplines, including environmental planning, urban ecology, data analysis, climate resilience, and systems management. Architects are expected to become coordinators who connect environmental, social, technological, and economic systems rather than focusing only on physical buildings.

The research also raises concerns about the impact of Artificial Intelligence and automation on architectural practice. As routine tasks become increasingly automated, architects may need to focus more on critical thinking, creativity, ethical decision-making, and long-term strategic planning. This shift may require significant changes in architectural education and professional training.

5. FINDINGS

5.1. Problem Question 1:
How Can Architecture Move from Reducing Damage to Improving the Environment?

The research shows that architecture is moving from sustainability towards regeneration. For many years, architects focused on reducing environmental harm by lowering energy use, reducing carbon

emissions, and improving efficiency. While these strategies remain important, they are no longer enough to address today's environmental challenges.

Climate change, biodiversity loss, water scarcity, pollution, and ecosystem degradation are increasing across the world. According to the IPCC, buildings and construction are responsible for nearly 37% of global carbon emissions. At the same time, the world has lost approximately 69% of monitored wildlife populations since 1970. These environmental pressures are forcing architects to rethink the role of buildings within the environment.

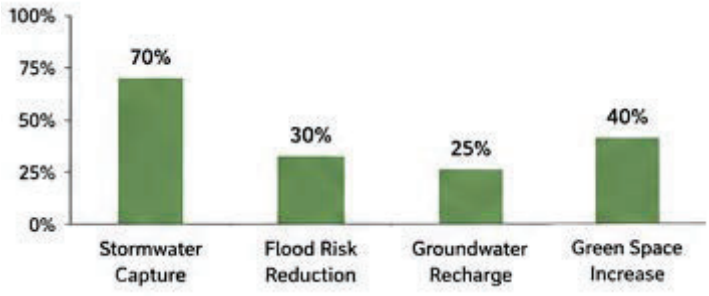
Buildings are no longer expected to simply consume fewer resources. They are now expected to contribute positively to their surroundings by improving biodiversity, managing water, reducing urban heat, storing carbon, and supporting ecosystem health. This shift has led to the growing popularity of regenerative design and Nature-Based Solutions (NbS).

Case Study 1: Sponge Cities, China

The Sponge City programme was created in response to severe urban flooding, water pollution, and the loss of natural drainage systems caused by rapid urban growth. By 2020, more than 640 Chinese cities were experiencing regular urban flooding, causing billions of dollars in damages every year.

Instead of directing water away as quickly as possible, Sponge Cities allow rainwater to be absorbed, filtered, stored, and reused through wetlands, bioswales, rain gardens, retention ponds, green corridors, and permeable surfaces. The Chinese government set a target for cities to absorb and reuse 70% of rainwater through natural systems.Although the programme was developed for large Chinese cities, its main lesson is highly transferable. The project demonstrates that cities can work with natural systems instead of constantly trying to control them.

For Pakistan, where both flooding and water scarcity are major challenges, similar strategies could help recharge groundwater, reduce flood risks, improve water quality, and create healthier urban environments.



Case Study 2: Ijburg Floating Houses, Amsterdam

The Ijburg Floating Houses were developed in response to rising sea levels, increasing flood risks, and limited land availability in the Netherlands. Around 26% of the Netherlands lies below sea level, making water management a national priority.

Rather than resisting water through walls and barriers, the project embraces water as part of everyday life. The houses sit on floating foundations that rise and fall with changing water levels, allowing them to

remain functional during flooding events.The project depends on adaptive engineering systems, floating infrastructure, and long-term water management strategies. While floating communities may not be practical everywhere, the larger lesson is extremely important. The project demonstrates how architecture can adapt to environmental conditions instead of constantly fighting against them.

For Pakistan, particularly in flood-prone regions, the project introduces new ways of thinking about resilience and adaptation in future developments.

Key Findings

The case studies reveal a major shift in architectural thinking. Future projects are increasingly designed as part of ecological systems rather than isolated objects.

Common themes include:

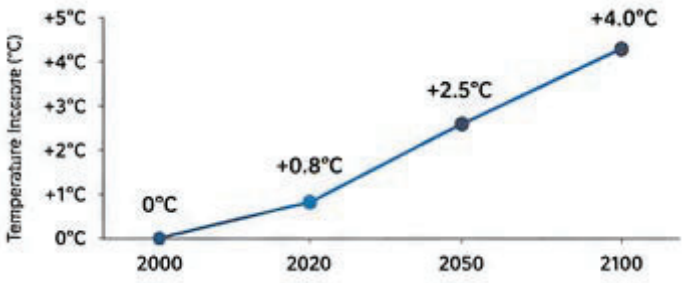
- Buildings functioning as environmental infrastructure.
- Nature-based solutions replacing purely engineered systems.
- Water being treated as a resource rather than a problem.
- Biodiversity becoming a design requirement.
- Architecture working with natural systems instead of controlling them.

Implications for Pakistan

Pakistan faces rising temperatures, biodiversity loss, flooding, environmental degradation, and growing pressure on natural resources. Forests cover only around 5% of Pakistan's land area, while the global average is approximately 31%. The research suggests that future developments should combine regenerative design strategies with traditional Pakistani climate-responsive knowledge.Wetland restoration, rainwater harvesting, ecological corridors, native planting, and water-sensitive landscapes could become essential tools for future architectural practice.

5.2. Problem Question 2:
How Can Buildings Adapt to Future Climate Changes?

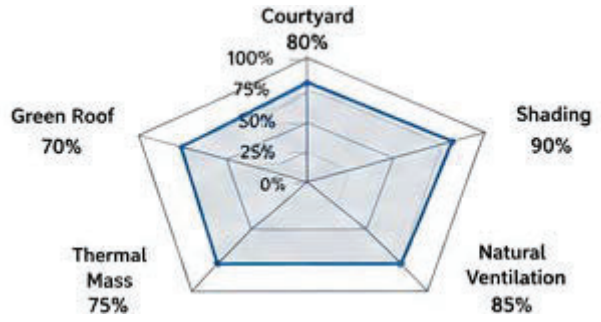
The research shows that climate adaptation is becoming one of the most important responsibilities of architecture. Buildings were traditionally designed according to historical climate conditions. However, climate change is creating a future that is hotter, less predictable, and more extreme than before.



Pakistan is considered one of the most climate-vulnerable countries in the world. During the 2022 floods, approximately 33 million people were affected and economic losses exceeded US$30 billion. At the same time, some areas of Pakistan have

recorded temperatures above 50°C during recent heatwaves. These challenges show that future buildings can no longer rely on conventional design approaches.

The research highlights several important strategies for climate adaptation. Passive cooling methods such as courtyards, shading devices, natural ventilation, and proper building orientation can reduce cooling energy demand by 20–50%. Water-sensitive design strategies such as rainwater harvesting, sustainable drainage systems, and wetland restoration help buildings respond to both flooding and water scarcity. Renewable energy systems and resilient site planning are also becoming increasingly important as energy demand continues to rise.



The research further shows that climate adaptation is not only about buildings. It also involves landscape design, water management, ecological systems, and long-term planning. Successful climate-responsive projects work with environmental systems rather than trying to control them.

Case Study 1: Masdar City, UAE

Masdar City was developed in response to extreme heat, high energy consumption, and harsh desert conditions in Abu Dhabi.

The project combines traditional environmental design strategies with modern technology. Narrow streets, shaded walkways, wind towers, building orientation, and passive cooling systems work together to reduce heat gain and improve comfort. Studies show that some outdoor areas within Masdar City can be 10–15°C cooler than surrounding desert environments.The city also integrates renewable energy systems and efficient water-management strategies to reduce resource consumption. Although Masdar City was designed for a desert climate, many of its principles can be applied elsewhere.

For Pakistan, the project demonstrates how traditional climate-responsive ideas can be combined with modern technologies to reduce energy consumption and improve resilience in increasingly hot urban environments.

Case Study 2: Room for the River, Netherlands

The Room for the River programme was developed to address growing flood risks caused by climate change.

Instead of building larger flood barriers, the Dutch government redesigned landscapes to give rivers more space during flood events. More than 30 major projects were completed under the programme, including floodplain restoration, water retention areas, and river widening strategies.The project relies on landscape planning, ecological restoration, and long-term environmental management. Rather than

resisting water, it accepts flooding as a natural process and designs around it.Although developed in the Netherlands, the project provides valuable lessons for countries facing increasing flood risks.

For Pakistan, particularly after the devastating floods of 2022, the project demonstrates how flood resilience can be improved through landscape planning and natural water-management systems.

Key Findings

The case studies reveal several important trends in climate adaptation:

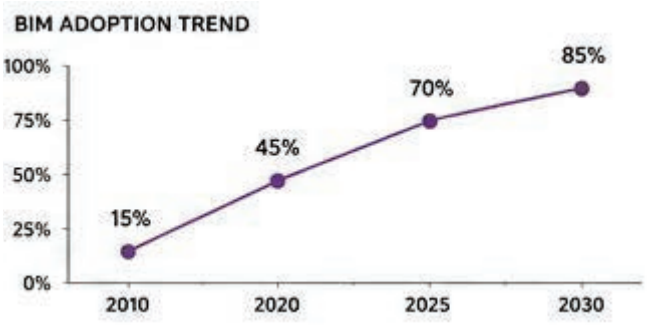
- Future buildings must be designed for future climate conditions rather than past climate data.
- Passive design remains one of the most effective climate adaptation strategies.
- Water-sensitive planning is becoming increasingly important.
- Renewable energy improves building resilience.
- Landscape planning plays a major role in reducing climate risks.
- Successful projects work with environmental systems rather than against them.

Implications for Pakistan

Pakistan faces increasing temperatures, water shortages, flooding, and energy challenges. The research suggests that future developments should combine passive cooling, renewable energy systems, water-sensitive design, ecological restoration, and resilient site planning.Many of these strategies already exist within traditional Pakistani architecture and can be strengthened through modern technologies. By combining local knowledge with climate-responsive innovation, architects can create buildings that remain comfortable, efficient, and resilient under future climate conditions.

5.3. Problem Question 3: How Will Technology Change Architecture?

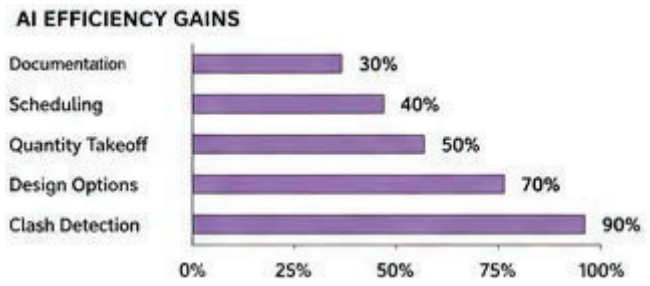
The research shows that technology is changing architecture from a drawing-based profession into a data-driven profession. Architects are no longer working only with sketches, drawings, and physical models. Today, technologies such as Artificial Intelligence (AI), Building Information Modelling (BIM), digital twins, sensors, automation, and smart building systems are transforming how buildings are designed, constructed, and managed.



The global construction industry contributes approximately 13% of the world's GDP, yet productivity growth has remained below 1% per year for many decades. Research by McKinsey suggests that digital technologies can improve construction productivity by 14–15% while reducing project costs by around 4–6%.

These figures show why the industry is increasingly investing in technological innovation.

The research also shows that BIM is becoming a standard practice across the world. Studies suggest that BIM can reduce design clashes by up to 40%, lower project costs by approximately 10%, and reduce project completion time by 7–15% through better coordination between consultants and contractors.At the same time, AI is making it possible for architects to analyse thousands of design options within minutes. Research indicates that AI-assisted design processes can reduce early-stage design time by 30–50% while improving environmental and performance analysis.



However, the research also highlights that technology should not be viewed as a replacement for architects. Human creativity, design judgment, cultural understanding, ethics, and decision-making remain essential parts of architectural practice. Technology is most effective when it supports architects rather than replaces them.

Case Study 1: Al Bahar Towers, UAE

Al Bahar Towers were designed in response to the extreme heat and intense solar exposure of Abu Dhabi.

The project combines advanced technology with traditional Islamic architectural ideas. The building uses a responsive façade system inspired by the traditional mashrabiya screen. More than 2,000 movable shading panels automatically open and close throughout the day depending on the position of the sun.This smart façade reduces solar heat gain by almost 50%, significantly lowering cooling requirements and improving indoor comfort. The project relies on sensors, environmental analysis, digital modelling, and automated control systems.While the technology was developed for Abu Dhabi's desert climate, the larger lesson can be applied anywhere. The project demonstrates how technology can improve environmental performance while still respecting local culture and identity.

For Pakistan, the project highlights how smart building systems can reduce energy consumption and improve thermal comfort in cities that experience increasing temperatures and energy shortages.

Case Study 2: Virtual Singapore

Virtual Singapore was developed to improve urban planning, environmental management, transportation systems, and infrastructure coordination.

The project creates a digital twin of the entire city-state, covering approximately 730 square kilometres. It combines real-time information from buildings, infrastructure networks, transportation systems, and environmental data into one digital platform.The system relies on BIM, GIS mapping, sensors, cloud

computing, and advanced data analytics. Planners can test future scenarios before implementing decisions, reducing risks and improving efficiency.Although Singapore operates on a different scale than Pakistan, the core lesson is highly transferable. The project demonstrates how digital information can improve decision-making and support long-term planning.

For Pakistan, similar technologies could help address challenges related to urban growth, transportation planning, flood management, climate adaptation, and infrastructure development.

Key Findings

The case studies reveal several important trends:

- Architecture is becoming increasingly data-driven.
- BIM is becoming the standard tool for coordination and project management.
- Smart buildings can continuously monitor and improve their performance.
- AI allows architects to explore more design options in less time.
- Technology works best when combined with local knowledge and human creativity.
- Future architects will increasingly manage information rather than only produce drawings.

Implications for Pakistan

Pakistan's construction industry still faces challenges such as fragmented workflows, poor coordination, and limited digital integration. The research suggests that BIM adoption, environmental simulation tools, digital project management, and smart building technologies can significantly improve project quality and efficiency. Architectural firms that invest in digital skills, AI literacy, data management, and performance analysis will be better prepared for future industry demands. However, technology should always support architectural thinking rather than replace it.

5.4 Problem Question 4:
How Can Architecture Stay Culturally Adaptable in a Rapidly Changing World?

The research shows that architecture is facing an important cultural challenge. Globalization, digital media, migration, tourism, and rapid urbanization are making cities around the world look increasingly similar. Many new developments focus on efficiency, technology, and global design trends, often at the expense of local identity and cultural character.

Today, approximately 56% of the world's population lives in urban areas. According to the United Nations, this figure is expected to reach nearly 70% by 2050. As cities continue to grow and become more connected, there is a growing risk that unique local identities may gradually disappear.Research also shows that cultural heritage is under increasing pressure. UNESCO estimates that nearly 40% of cultural heritage sites worldwide face risks from climate change, urban development, tourism pressures, and environmental degradation. These challenges highlight the need for architecture that can evolve with society while still protecting cultural values and identity.

The research suggests that culture should not be treated as something fixed in the past. Successful architecture does not simply copy traditional buildings. Instead, it reinterprets local materials, traditions, social values, and environmental responses in ways that remain relevant to modern life. Future architecture must therefore balance global innovation with local identity. Buildings should be flexible enough to respond to changing lifestyles while maintaining a strong connection to place, history, and community.

Case Study 1: Louvre Abu Dhabi, UAE

The Louvre Abu Dhabi was developed to create a global cultural institution while maintaining a strong connection to regional identity.

The project combines contemporary engineering with traditional Arabic architectural ideas. Its most recognizable feature is a dome measuring approximately 180 metres in diameter. The dome is made up of nearly 8,000 layered metal stars that filter sunlight and create a unique "rain of light" effect throughout the building. The project relies on advanced engineering systems while drawing inspiration from traditional Middle Eastern urban spaces, shading strategies, and cultural patterns. Rather than copying historical architecture, the project reinterprets cultural elements in a modern form. This allows the building to feel both contemporary and deeply connected to its location.

For Pakistan, the project demonstrates how modern architecture can remain globally relevant while still expressing local culture, climate, and identity.

Case Study 2: Bait Ur Rouf Mosque, Bangladesh

The Bait Ur Rouf Mosque was developed to provide a meaningful religious and community space rooted in local culture and everyday life.

The project uses locally available brick, natural ventilation, daylight, and simple construction techniques. Instead of relying on expensive materials or advanced technologies, the design focuses on human experience, spirituality, and community needs. The building depends largely on passive environmental strategies, reducing the need for mechanical cooling systems. Its success led to international recognition, including the Aga Khan Award for Architecture. The project demonstrates that cultural value does not come from iconic forms or expensive materials. Instead, it comes from understanding local traditions, people, and social practices.

For Pakistan, the project highlights the importance of preserving local craftsmanship, climate-responsive design, and community-focused architecture in a rapidly changing world.

Key Findings

The case studies reveal several important trends:

• Cultural identity remains important despite globalization.
• Successful architecture adapts traditions instead of copying them.
• Local materials and craftsmanship continue to have value.
• Buildings should respond to community needs and social values.
• Technology and cultural identity can work together.
• Architecture should strengthen a sense of place and belonging.

Implications for Pakistan

Pakistan has a rich architectural heritage shaped by climate, religion, culture, materials, and regional traditions. However, many contemporary developments increasingly follow global design trends without responding to local contexts. The research suggests that future architectural practice should combine modern innovation with local knowledge, cultural values, and regional identity. Projects that successfully balance global ideas with local character will be more meaningful, sustainable, and socially successful. Rather than choosing between tradition and modernity, architects should find ways to connect both. This approach will help ensure that future development remains culturally relevant while still responding to contemporary challenges.

6. ANALYSIS / DISCUSSION

6.1. Emerging Themes

Although the three research questions explored different topics, several common themes appeared throughout the research.

The first theme is that architecture is shifting from designing individual buildings to designing systems. Future projects are increasingly connected to larger environmental, technological, and social networks. Water systems, biodiversity, energy, mobility, digital infrastructure, and community resilience are becoming as important as the building itself. The research also suggests that the role of architects is expanding. Architects are increasingly becoming coordinators of systems rather than only designers of buildings.

The second theme is uncertainty. Climate change, technological disruption, and rapid urbanization are creating conditions that are difficult to predict. As a result, architects can no longer design only for present conditions. Future projects must be able to adapt to changing environmental, social, and technological circumstances.

The third theme is integration. The most successful projects do not separate architecture, landscape, technology, and ecology. Instead, they combine these elements into a single system. Future practice will require greater collaboration between architects, environmental specialists, engineers, planners, and technology experts.

The Architect as a Systems Thinker in the Age of AI

One of the most significant challenges facing architecture is how Artificial Intelligence will fundamentally transform the profession. For decades, much of architectural practice has been centred around tasks such as drafting, modelling, documentation, coordination, and project management. These activities require significant time, technical expertise, and human labour. However, AI and automation are increasingly capable of performing many of these functions faster and more efficiently than humans. As a result, the traditional role of the architect may shrink in some areas while expanding in others. Rather than acting primarily as producers of drawings and documentation, architects may become decision-makers, strategists, and coordinators of complex environmental and technological systems.

6.2. Future Education of Architects

The future architect may spend more time managing relationships between climate, ecology, technology, infrastructure, and society. This shift presents major implications for architectural education. Current architectural curricula remain heavily focused on representation, drafting, software proficiency, and building design. Architectural education may need to prioritise systems thinking, climate science, ecology, data analysis, and ethical decision-making. Future architects will need to understand hydrological systems, biodiversity networks, carbon cycles, energy infrastructure, and social resilience alongside traditional design principles. Most importantly, education will need to focus on developing uniquely human capabilities such as creativity, critical thinking, leadership, and the ability to navigate uncertainty.

The Future of Architecture May Involve Less Building

One of the most radical ideas emerging from the research is the possibility that future architecture may involve less construction rather than more. Traditionally, architects respond to problems by designing new buildings. However, many of the environmental challenges facing contemporary cities are direct consequences of excessive construction, resource consumption, and ecological disruption. In some cases, the most effective response may not be to build something new but to restore what already exists.

Future architectural practice could increasingly focus on ecological restoration, urban rewilding, wetland recovery, and environmental repair. Architects may become involved in removing obsolete infrastructure, transforming degraded landscapes, and restoring natural systems rather than constructing new buildings. This challenges one of the profession's assumptions that architecture is primarily about creating physical objects.

Architecture as the Design of Consequences

Perhaps the most important theme emerging from the research is the idea that architecture should be understood as the design of consequences rather than the design of buildings. Traditional architectural practice often focuses on immediate outcomes such as aesthetics, function, cost, and construction efficiency. However, climate change, technological disruption, and environmental degradation

demonstrate that the true impact of architecture unfolds over decades. Every building influences water systems, biodiversity, energy consumption, social behaviour, economic activity, and future development patterns.

This suggests that architects should shift their focus from objects to outcomes. Instead of asking what a building should look like, future architects may need to ask what consequences it will create over the next fifty years. Will it improve ecological health? Will it strengthen community resilience? Will it increase dependence on vulnerable infrastructure? Will it remain adaptable as conditions change? By focusing on long-term consequences, architecture expands beyond the production of buildings and becomes a discipline concerned with shaping future environmental and social conditions.

Preparing for an Uncertain Future

The research ultimately suggests that the greatest challenge facing architecture is uncertainty itself. Climate change, artificial intelligence, demographic shifts, and technological acceleration are creating conditions that are increasingly difficult to predict. Future architects will not be designing for stable environments but for systems that are constantly changing. Rather than designing fixed solutions, architects may need to design adaptable systems capable of evolving over time.

Preparing for this future begins today. Architectural firms should invest in AI literacy, environmental science, ecological design, and interdisciplinary collaboration. Universities should integrate systems thinking, climate adaptation, and technological ethics into their curricula. Most importantly, architects must begin questioning many of the assumptions that currently define the profession. The future may not belong to architects who design the most impressive buildings, but to those who best understand the long-term environmental, social, and technological consequences of their decisions. In this sense, the architect of the future may no longer be a building designer at all, but a systems thinker responsible for shaping the conditions through which future societies can survive and thrive.

The End of Sustainability and the Rise of Regeneration

A major theme emerging from the research is the possibility that sustainability, as it is currently understood, may no longer be an adequate framework for addressing future environmental challenges. Sustainability is generally defined as maintaining resources and reducing environmental damage. However, in countries such as Pakistan, environmental degradation has already reached critical levels. Water systems are collapsing, biodiversity is declining, urban heat islands are intensifying, and flood risks are increasing. Under these conditions, simply reducing harm may not be enough. The question becomes: what exactly are we trying to sustain if the existing conditions are already unsustainable?

This suggests that future architecture may need to move beyond sustainability towards regeneration. Regenerative architecture does not aim merely to minimise environmental impact but to actively improve ecological conditions. Buildings could be designed to restore biodiversity, recharge groundwater, increase vegetation, improve air quality, and repair damaged ecosystems. Success would no longer be

measured by how little damage a project causes, but by how much environmental value it creates. This represents a profound shift in how architects understand their responsibility to the environment.

Challenging Imported Sustainability Models

Another important discussion concerns the suitability of existing sustainability frameworks within the Pakistani context. Most contemporary sustainability standards, such as LEED, BREEAM, and WELL, were developed in North America and Europe. These frameworks reflect the environmental, economic, technological, and cultural realities of developed countries. However, Pakistan operates under very different conditions. Issues such as unreliable infrastructure, extreme climates, informal urbanisation, limited resources, and strong vernacular traditions require different approaches to environmental design.

Many traditional Pakistani buildings already incorporate passive cooling strategies, natural ventilation, shaded courtyards, thick thermal walls, and climate-responsive planning that evolved over centuries in response to local environmental conditions. Ironically, some of these solutions may perform better environmentally than technologically sophisticated buildings designed according to imported sustainability standards. This raises an important challenge: are architects pursuing genuine sustainability, or are they simply following international certification systems that may not reflect local realities? The future may require Pakistan to develop its own sustainability frameworks based on local climates, materials, cultural practices, and environmental challenges. Rather than importing solutions, architects may need to redefine sustainability from a regional perspective.

6.3. Challenges and Critique

While technology and sustainability are often presented as solutions, the research also raises important concerns.

One major challenge is the increasing dependence on technology. AI can generate design options, automate documentation, analyse performance, and coordinate projects. As these tools become more powerful, many traditional architectural tasks may become automated.

This creates an important question: if software can generate drawings, optimise layouts, and manage information, what role remains for architects? The research suggests that architecture cannot rely only on data and technology. Human experience, culture, identity, ethics, memory, and social values cannot be fully measured or generated by algorithms.

Another challenge is the assumption that more development always creates better outcomes. Many environmental problems facing cities today are the result of excessive construction, resource consumption, and ecological disruption. Future architectural practice may need to question not only how we build, but also when we build and whether building is always the correct solution.

The research also highlights the challenge of applying global solutions within Pakistan. Many successful international examples depend on advanced technologies and significant financial resources. Future architectural strategies must therefore be adapted to local economic, environmental, and cultural realities.

7. CONCLUSION

This research began by investigating climate change, ecology, technological advancement, and artificial intelligence as separate forces shaping the future of architecture. However, the findings suggest that these issues are not independent challenges. Together, they reveal a deeper transformation occurring within the profession itself. The future challenge for architecture is no longer simply how to design better buildings, but how to operate within a world defined by uncertainty, ecological instability, and accelerating technological change.

The future challenges facing architecture involve the long-term consequences that buildings create. Climate change, biodiversity loss, water scarcity, urban heat islands, energy consumption, and technological disruption are all consequences of decisions made through the built environment. Yet traditional architectural practice often focuses primarily on the design of physical objects rather than the long-term impacts those objects generate.

Based on these findings, Set Square proposes a new approach called **The Architecture of Consequences**.

This approach argues that architects should not only design buildings but also design the environmental, social, technological, and economic consequences that emerge from those buildings over time.

Rather than asking:

"What should this building look like?"

Future architects should ask:

"What consequences will this project create over the next fifty years?"

This changes how success is measured. Instead of evaluating projects only through appearance, cost, or floor area, projects should also be evaluated through their impact on biodiversity, water systems, climate resilience, energy use, social wellbeing, and future adaptability.

In this model, the architect becomes a consequence designer , someone responsible for understanding how design decisions influence future generations, ecosystems, communities, and technologies.

Artificial Intelligence may automate many technical tasks, but it cannot fully understand long-term human, cultural, environmental, and ethical consequences. These responsibilities remain uniquely human and will become increasingly important in the future.

For Set Square Architectural Firm, this approach provides a new professional direction. The firm aims to move beyond designing individual buildings and towards designing positive long-term outcomes. Buildings remain important, but they become only one tool for shaping resilient and sustainable futures.

The primary responsibility of future architects may not be to predict the future accurately, but to create systems, spaces, and environments capable of responding to multiple possible futures. Success will no longer depend on how efficiently a building performs under expected conditions, but on how effectively it can adapt to unexpected ones. Future architects may become system thinkers who manage relationships between environmental processes, technological infrastructures, cultural values, and human needs.

For Pakistan, this transformation presents both a challenge and an opportunity. Imported models of sustainability and development cannot fully address local realities . The future of architecture in Pakistan may therefore depend on developing new models rooted in local climates, indigenous knowledge, vernacular practices, and regional environmental conditions.

Ultimately, the future architect may be remembered not for the buildings they create, but for the futures they make possible. In an age where climate conditions are uncertain, technologies evolve rapidly, and societies continuously transform, architecture's greatest responsibility may be neither the design of objects nor the management of consequences. It may be the creation of systems capable of adapting, surviving, and evolving through change itself.

Limitations and Research Gaps

This research has several limitations. This Desk Research relied on secondary sources, literature reviews, and international case studies. As a result, many of the conclusions remain theoretical. Furthermore, the rapidly changing nature of artificial intelligence, climate science, and digital technologies means that some predictions may evolve significantly over time.

Several research gaps were identified throughout the study. There is currently limited research examining how artificial intelligence may transform architectural education and professional practice within developing countries. Similarly, there is insufficient investigation into how traditional Pakistani architectural knowledge can be systematically integrated with contemporary technologies and climate adaptation strategies. Existing sustainability frameworks have also received little critical evaluation regarding their suitability for Pakistan's environmental and socio-economic conditions. Furthermore, there is a lack of research available exploring the role of architects in ecological restoration, environmental governance, and long-term systems management beyond conventional building design.

Ideas for Future Research

Future research should focus on developing architectural models specifically tailored to Pakistan's environmental challenges, cultural practices, and economic realities. Studies could investigate new frameworks for regenerative architecture, climate adaptation, ecological restoration, and AI-assisted

design within local contexts. Future work should also include stakeholder interviews, professional surveys, pilot projects, and experimental design research to test the practical application of the ideas proposed in this report. Particular attention should be given to emerging questions such as climate migration, adaptive infrastructure, urban resilience, and the changing relationship between human creativity and artificial intelligence.

Based on these findings, this research proposes that the future of architecture should be understood not as the design of buildings, but as the design of consequences and adaptability. In a world increasingly defined by environmental uncertainty, technological disruption, and social transformation, the architect's primary responsibility may no longer be to create fixed solutions. Instead, architects must create systems capable of learning, evolving, and responding to change over time.

8. REFERENCES

1. Imran, R. (2024). *Nature-Based Solutions for Urban Climate Change Adaptation in Pakistan*. NUML Journal of Economics.
2. WWF-Pakistan. *Nature-Based Solutions*.
3. Waseem, K. (2025). *Urban Forestry in Pakistan: Assessing Sustainability Based on Ecosystem Services and Nature-Based Solutions*. Discover Environment.
4. WWF & Recharge Pakistan Programme. *Ecosystem-Based Adaptation for Integrated Flood Risk Management*.
5. Castellar et al. (2021). *Nature-Based Solutions in the Urban Context: Terminology, Classification and Scoring for Urban Challenges and Ecosystem Services*.
6. Intergovernmental Panel on Climate Change. *Climate Change 2023: Synthesis Report.*
7. UN-Habitat Pakistan Climate Change Programme
8. World Bank Climate Risk Country Profile: Pakistan
9. Asian Development Bank – Climate Risk and Adaptation in Pakistan
10. WWF-Pakistan Nature-Based Solutions Programme
11. Pakistan Meteorological Department
12. UN Environment Programme – Building Climate Resilience Through Green Infrastructure
13. Autodesk. What is BIM? Overview of Building Information Modeling and lifecycle coordination.
14. McKinsey & Company. The rise of generative AI in design and construction (industry analysis on productivity, design exploration, and workflow automation).
15. Pakistan engineering/construction digitalization and BIM adoption discussions (industry and professional practice sources).
16. World Economic Forum / industry reports on digital twins, smart buildings, and construction technology trends.

Architecture at a Turning Point:

Bridging the Gap Between Architectural Education and Professional Practice

Assignment: Final Report

Course: Professional Practice

Authors: Rabia, Fatima Hammad, Eiman Chaudry, Raeed, Haseeb

Institutional Affiliation: Beaconhouse National University

Date of Submission: June 15, 2026

Table of Contents

Executive Summary

The current times are an unprecedented change in architecture. The phenomenon of technological development, climate change, economic volatility, political unrest, mass migration and the rapid growth of AI are all changing the ways the built environment is designed, built and lived in. Such forces are impacting architectural education, as well as architectural practice, and pressing questions are being raised as to whether architectural education is doing enough to prepare for the future.

This research aims at exploring the connection between architectural education and practice through investigating the perceptions of academics, students, researchers and practicing professionals about the future of the discipline. The survey was sent to the respondents from various countries including United States, United Kingdom, Germany, Denmark, Türkiye and Australia. The research focused on the following perceptions: technological change, adaptation to climate change, global instability, being prepared for the profession, and the changing role of the architect.

The results indicate a lack of perceived connection between classroom and real-world professional preparation, climate responsiveness, technological literacy, and project management. The respondents identified three key forces will change the profession: artificial intelligence, climate change and economic pressures. While much of the technical aspects of architecture are seen as susceptible to automation, participants continuously stressed the importance of ethical decision-making, cultural understanding, creativity and human empathy in architecture.

The study finds that architecture is becoming more and more a systems thinking, ecologically responsible and socially responsible profession that requires interdisciplinary collaboration. The report suggests that changes should be made to architectural education to address these realities and suggests that greater interaction between the profession and the academic world should be encouraged.

1. Introduction

Throughout history, architecture has developed in tandem with the changes in society. The built environment and the role of the designer of architecture have been continually influenced by significant technological and social developments, from the beginning of industrialisation in the 19th century to the digital revolution in the late 20th century. Today, the discipline is undergoing another major change and the need for this change is more pressing than ever before.

Artificial Intelligence (AI), climate change, migration crisis, housing crisis, political instability, and economic uncertainties are changing the definition of cities' operation and the design, construction and life of buildings. Architects' work is no longer confined to building structures. Architects are increasingly expected to balance sustainability, resilience, social equity, policy, and technological innovation simultaneously.

Despite these changes, there remains a great concern that architectural education and practice are not progressing at the same rate. The fields of educational institutions and professional practice influence the future development of architects in different ways; long term (degree course) and short term (immediate) respectively. This inherent imbalance of speed and priority puts a tension in a structural form that is hard to address without intentional conversations between the two sectors.

This research is based on an observation that seems obvious but significant: The issues of "what will architecture be like in the future" are discussed at both universities and professional settings, but do not always seem to be about the same concerns. Both academics and practitioners can focus on different aspects of the course, such as theory, critical history, and design experimentation, or project delivery, regulatory compliance, client communication, and technological efficiency, respectively. Both views are valid but when they differ, there is one critical question:

Is the training of architects and their profession preparing for the same future?

The aim of this research is to examine the differences and similarities between the academic and practice-based viewpoints and to find opportunities for change in the field. The study aims to sketch a picture of the present state of architectural education and practice in several countries, and provide empirically-driven insights into areas where reform is most needed.

The study is not intended to make judgments about the relative importance of academic and professional values. Instead, it tries to map out the perceptions that are present and to share these with the aim of fostering better dialogue between the two communities.

The report follows the order outlined below. The research method used is described in the next section. The literature review is then followed by a discussion of the study in relation to the scholarly and professional literature. The findings section reports findings of the survey, both quantitative and qualitative. The discussion section explains these results in light of the previous studies, and the conclusions provide summary observations, limitations, and suggestions for future research.

2. Research Methodology

2.1 Research Design

This study used mixed method survey which included both quantitative and qualitative data collection. An instrument of a kind was developed to collect the opinions of those who are currently involved in the education and practice of architecture. The survey employed a mix of closed and open-ended questions using scales and likert questions to get a sense of overall trends as well as individual perspectives.

Deliberate use of the mixed-method design. A quantitative method would have allowed statistical comparison but not have been able to capture the richness of individual perceptions of the future of the discipline. A purely qualitative method would have been less appropriate to examine patterns in a geographically varied sample. Thus, it was decided that the simultaneous use of both methods would be the most suitable for the research question.

The survey covered four main areas: architectural education, professional practice, global change and future challenges, and AI and professional identity. Themes were drawn from a preliminary review of recent architectural scholarship and a review of recent professional commentary.

2.2 Participants

The respondents came from various professions such as architecture students, practicing architects, teachers and researchers. The respondents included in the study were found in various international settings, such as the United Kingdom, the United States, Germany, Denmark, Türkiye and Australia.

A deliberate attempt was made to make the pool of respondents as diverse as possible between academic and professional perspectives so as to make comparisons possible across various sectors of the discipline. No incentives were provided and participation was voluntary. The survey was conducted anonymously so that answers would be forthcoming.

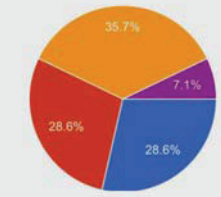
Note: There is no record of the total number of respondents in the data submitted. This should be confirmed and inserted prior to final submission.

2.3 Data Collection

Data was collected using Google Forms. The survey was sent out via faculty contacts, alumni networks, professional networks, international architecture student groups and academic peer networks. The sampling method used was purposive sampling with a particular focus on those with first-hand knowledge and experience with architecture.

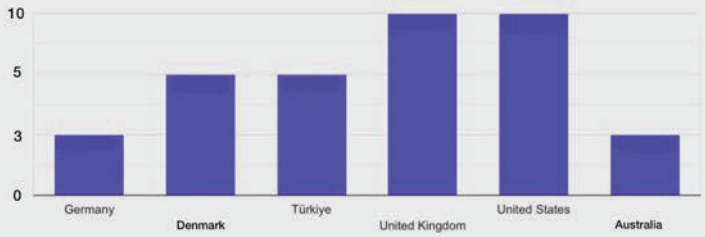
The distribution method was mainly digital and online interviews, providing efficient cross-country reach but also restricting access to respondents who do not have access to the internet. The survey could be completed for a specific amount of time and all the completed responses were used in the analyses.

What best describes your current role?

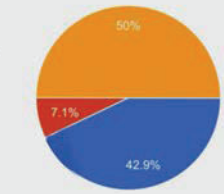


- Architecture student
- Practicing Architect
- Architecture Educator
- Urban designer
- Researcher

In which country do you currently study or practice?

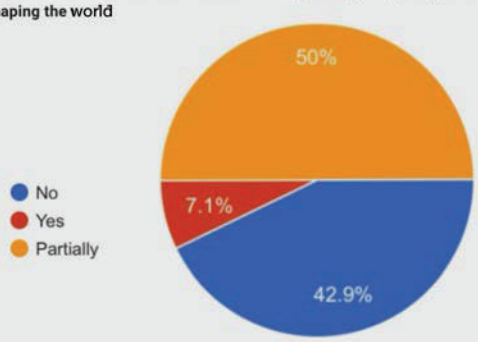


Which environment are you responding from?

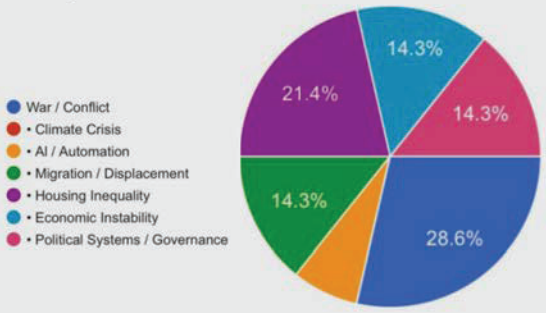


- Primarily Academic
- Primarily professional
- Both academic and professional

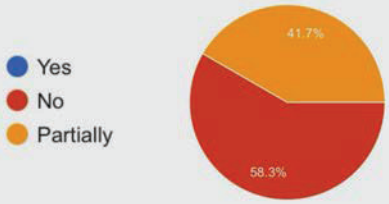
Do you believe architectural education is responding adequately to the realities shaping the world

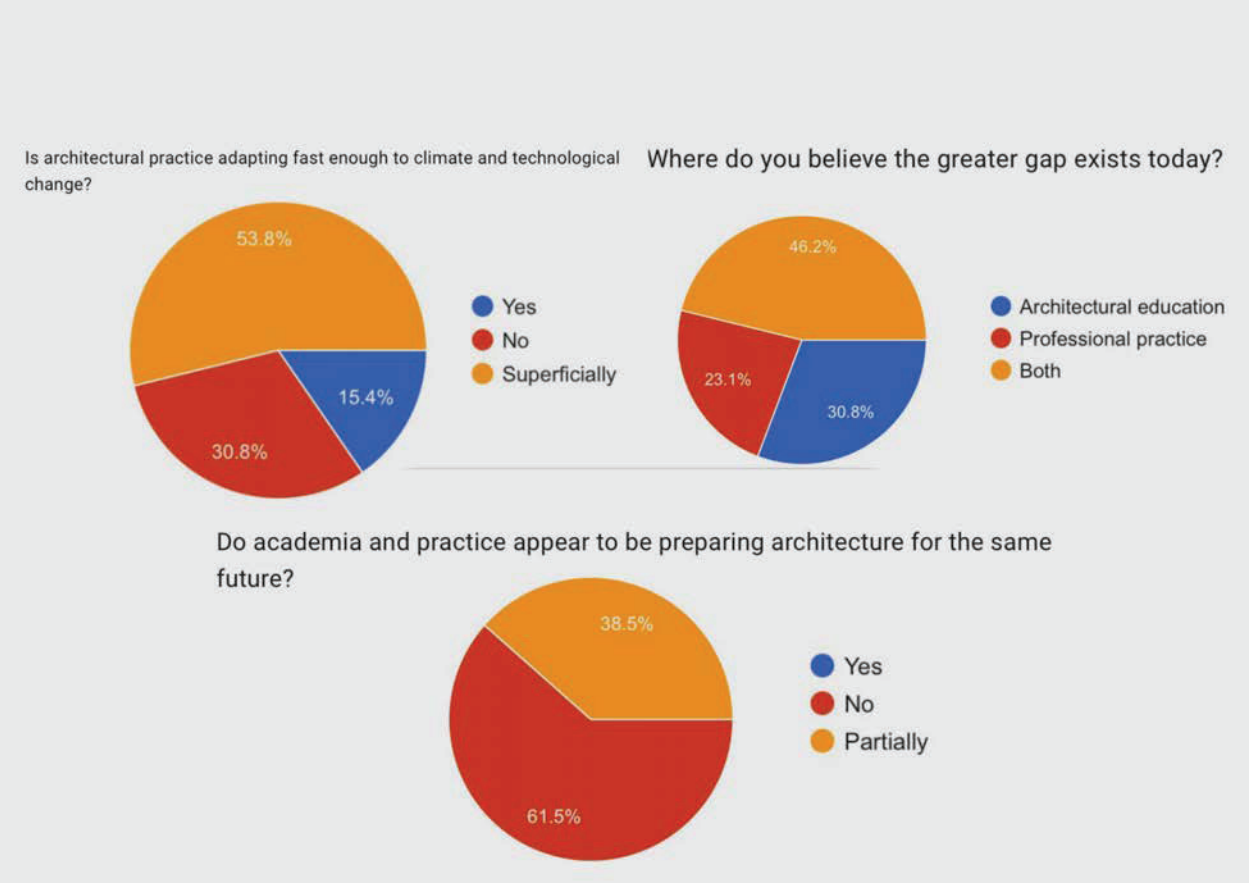


Which global condition is most underrepresented in architectural education today?



Do you believe architectural education is responding adequately to the realities shaping the world today?





2.4 Survey Structure

The questionnaire was divided into four sections:

A. Participant Background Information

Questions about the professional role, country of practice, academic or professional affiliation. This portion described the demographic characteristics of the respondents and made it possible to compare academic vs. professional groups.

Section B: Architectural Education

Inquiries about the relevance of education, deeming what is missing, and what is important right now. The respondents had to rate the condition of the present architectural education and indicate which they felt was in dire need of change.

This section covers professional practice.This section is on professional practice.

Questions probing today's problems, technological change and adaptation to global conditions. The aim of this section was to gain insight into the realities of contemporary practice from the perspective of practicing architects and related professionals.

Section D: Future Reflection

Open-ended questioning around the future identity of architecture, what architects can expect from AI, and the changing role of the architect. This section yielded the most qualitative information in the study.

2.5 Data Analysis

The quantitative data were analysed descriptively, with frequencies and percentages showing the prominent trends. Qualitative responses were analysed thematically by identifying a number of themes and using comparative analysis.

Thematic categories that emerged from the coding process were: education-practice gap, climate adaptation, technological transformation, professional readiness, human-centred design, social responsibility, and ethical decision-making. These categories did not exist prior to data analysis, but were developed inductively from the data. These were then used to structure the findings and discussion sections of this report.

3. Literature Review

The question of how architectural education relates to the practice of architecture has been a topic of discussion in architectural discourse for some time. In fact, there have been a number of times when questions have been asked and raised about the ability of architecture schools to prepare students for the reality they will face once they come into the world of practice.

Kenneth Frampton's work on critical regionalism has provided a lasting paradigm for the role of architecture in cultural, environmental and social context, and for its opposition to the homogenising forces of global modernisation by its deference to locality.[2] The view is still valid today because architects are faced with global challenges that are becoming more complex and that do not have a universal solution.

Such principles were also central to the work of Hassan Fathy, who showed that vernacular knowledge and local craft could produce architecture that was relevant to local social and environmental conditions rather than the uncritical appropriation of industrialised technology in rural Egypt.[2] Fathy's work has come to the fore in today's discussions of affordability, sustainability, and cultural identity.

More recently, Alejandro Aravena has stated that architects should relate to the other aspects of society, such as issues of housing and affordability, inequality and social inclusion, as these are social issues that can be addressed through the act of design.[3] His participatory design projects in Chile, however, have shown that architecture is not only an aesthetic or technical exercise but also a social intervention. In fact, one of the core concepts of the present study—namely, the importance of "social architecture"—is in line with the advocacy of Aravena.

As an intersection of technology and design, Branko Kolarevic discussed the implications of digital fabrication and computational design on architectural practice trends that have since become key components of the current AI revolutionbefore it. These previous digital changes are continuing and expanding into the rise of AI-supported design tools, which are a qualitatively different challenge at a different scale.

Climate change has become one of the most significant challenges in contemporary architectural research and practice. Climate change responses put architecture at the heart of the climate crisis and the built environment has a significant role in greenhouse gas emissions.[5] Architects need to be climate literate and scholars are increasingly identifying the skills of resilience, adaptation and sustainable design as key competencies for the future of the architectural profession.

Carlo Ratti and Matthew Claudel have explored data-driven urbanism and networked cities and how these conditions are impacting on the architecture and planning process, focusing on the growing need for systems thinking, inter-disciplinary understanding and the use of real-time data for the design and management of urban built environments. It is a development that questions the traditional education model which is mostly based on the individual design authorship.

Juhani Pallasmaa's emphasis on the embodied, sensory, and phenomenological features of architecture is also a welcome corrective to the technocentric visions of the future that architects and educators often have. Pallasmaa's work reminds us that architecture is not merely about function and efficiency, but also about the human experience.

While there is significant research focusing on issues of sustainability and/or technology and/or professional practice individually, fewer studies directly compare these perspectives across academia and practice with regard to the future of architecture. This research relies on this under-studied field by collecting and comparing community views at a snapshot in time.

4. Findings

The survey aimed to gain insight into the perspective of people engaged with the education and practice of architecture, regarding the future of the discipline. Several common themes emerged from both quantitative and qualitative answers. This analysis is organised thematically (around the key questions of the survey). Representative quotations are provided, not to imply the statistical significance of any single response, but to show the qualitative nature.

A.3 Relevance of Architectural Education to the present time

One of the recurring and central issues was the feeling of disconnect which existed between the architectural sphere and professional practice. There was a concern that many models used in higher education still focus on conceptual studio-based projects and that there is still not sufficient exposure to the practical demands of work, such as project management, construction processes, contractual aspects, regulations, and interdisciplinary working.

A few of the respondents also questioned the unaltered image of the architect and his conception of himself as an individual creative writer. They believed that architectural practice should be more collaborative and based on systems thinking, as some educational cultures overly develop the role of the

"starchitect," which they felt was inadequate at preparing students for collective practice in real projects.

Respondents identified the following as key themes in their responses to this question:

The lack of a connection between school-based learning and work practice.

The lasting status of the individual "starchitect" or creative genius.

A lack of new pedagogical approaches and insufficient critical thinking on curriculum.

- Lack of systems thinking and integrative design approaches
- Few chances for exposure to industry, clients, contractors and regulatory entities

Representative response: "Architecture has many facets and should be educating students for more than starchitect garbage.

We must identify what schools should prioritise.We need to determine what schools should prioritise.

The top priorities that respondents felt architecture schools need to be more concerned about were climate adaptation, sustainability, housing affordability, and professional readiness. Participants expressed a strong desire for increased focus on curriculum in environmental systems, disaster resilience, social equity, public policy, and technological literacy. Others emphasized the need to make students aware of the realities in the professional world, such as managing contracts, financial management, building codes and licensure processes.

The responses highlighted the following priorities:

The ability to withstand climate dangers and move towards more sustainable living.Resilience and sustainability to climate risks.

Housing affordability and accessibility as the design goals

- Professional Readiness (Licensure, Practice Management)

It is also expected that the emergence of new digital technologies and artificial intelligence will be incorporated into the project.

The use of interdisciplinary working and collaboration across and between sectors.

Average answer: "Sustainability, low costs and social responsibility should be paramount in the design of architecture rather than aesthetics.

4.4 Design in the context of politics and governance

The participants identified a range of factors that are currently impacting professional practice, which mostly fell into four themes: Economic pressures and market volatility; Regulatory and policy change;

Technological transformation, primarily with the introduction of AI and Building Information Modelling (BIM); and Climate requirements and environmental regulations.

Typical answer: "Climate policy and incorporation of digital technology.

The discovery implies that the architectural design process is increasingly influenced by factors beyond just architectural design and that architects must deal with a combination of technology, economy and environment.

4.4 Impact of Global Instability

The majority of respondents were in agreement that the world is more unstable and architects are more responsible than ever. Discussions were held on topics such as migration, housing affordability, disaster resilience, reconstruction after conflict and economic inequality. There was a general consensus that architects are now being called on to address social and humanitarian issues – not only the creation of physical objects.

Representative answer: "Architects are being asked to address issues of migration, affordability, resilience, and social infrastructure more and more.

This discovery is a sign of a radical change in the perception of the range and purpose of architecture.

Tasks prone to AI automation.Tasks that are likely to be automated by AI (4.5).

Most respondents pointed to repetitive and technical tasks as being most easily automated with AI. Activities that AI could increasingly be more efficient and less expensive in producing, such as technical drafting, rendering, documentation production, and BIM coordination were consistently mentioned.

Tasks that are most common in the list of things that could be automated:

- Technical drawing and CAD manufacturing.

Use of documentation, schedules and specification writing.

Scene view rendering and computations visualisation.Visualisation of scenes by rendering and computations.

- Coordinating BIM models and detecting clashes.

Typical response: "Technical drafting and repetitive visualisation tasks.

Overall, participants had a positive perception of the potential for AI to replace repetitive production tasks but not materially disrupt more complex design decision-making processes.

4.6 Tasks That Must Remain Human

Even though some were concerned about automation, the participants across all the groups were adamant to keep architectural work essentially human. There was a consistency in the focus of the

academic and professional respondents on ethical judgment, cultural understanding, empathy, creativity, and spatial interpretation.

The capacities which are recognized as being irreducibly human are:

The power to make ethical decisions and to think morally.

- Snohomish County Schools must ensure that all instruction and accommodations are culturally responsive and contextually sensitive.

Empathy Design and the role of Humans in Design

- Ability to think outside the box and innovate

Common answer: "AI is a tool, and it must be used as such.

This discovery complements Pallasmaa's claim that the most important function of architecture is its ability to relate to the human body, to the cultural memory, and to human experience.[7]

4.7 Priorities for the Next Decade

The respondents supported an adaptive and responsible attitude towards architecture in the next 10 years. Climate adaptation, adaptive use of existing buildings, circular economy principles, social responsibility, affordability and human centred design were the prevailing concerns.

Representative answer: "Cities are for the people to live in, not to be viewed on their own.

This is a general feeling that has been expressed throughout the survey: that the role of architecture needs to be re-focused around quality of human life and not formal or technological novelty.

5.0 Future Identity of the Client

The last survey section asked for some predictions about the future identity of architects and architecture. A recurring theme was the idea that architects would evolve into an increased role of system management and coordination for large systems.

Future professional jobs suggested by respondents were:

- Spatial Strategist
- Human Habitat Designer
- Environmental Systems Designer
- Civic Design Strategist
- Place Steward
- Spatial Diplomat

A large number of respondents also noted that "future architects" may be more and more called upon to play a role as an environmental scientist, as a systems strategist, as a policy advisor, as a community organiser, or as a climate adaptation specialist.

The answers indicate a trend toward seeing architecture as a more holistic and social practice that cares for the environment, manages systems, and coordinates communities.

5. Discussion

From the results and conclusions of the present study, it can be inferred that there is a general compatibility in the directions in which both architectural education and professional practice are going, but on different paces and with different priorities. Both industries are aware of the need for sustainability, technological innovation and social responsibility, but do so at different speeds and in different ways.

One of the survey's main findings was the sense that architectural instruction is still somewhat divorced from the practice of architecture. The lack of adequate integration of practice management, licensing, construction knowledge and interdisciplinary practice in current curricula was often noted by the respondents. This discovery is consistent with the historical discussions in architectural scholarship. Frampton's comments about architecture's tendency to become purely aesthetic and Fathy's focus on social and environmental concerns of an architect, both precede the concerns expressed by the survey respondents.

Especially important findings on artificial intelligence. The participants had a general impression that AI is a game-changer, capable of automating technical drafting, rendering, documentation, and coordination tasks. But there was no doubt, the participants did not want to replace the key role of architecture with AI. The skills that had to stay human were always examined, and they included empathy, ethical thought, cultural understanding and creative judgment. This is a role that embodies and manifests the architectural experience that Pallasmaa calls “phenomenological” and which cannot be expressed in terms of data or algorithm.[7]

An important tension emerges in the findings in the discussion of AI. Respondents expressed concern about the risk of jobs being lost in technical positions. At the other end of the scale, they presented an idea of architecture that is not so technical, but rather one of judgment, coordination, and social involvement. These two are not mutually exclusive. They argue that the profession must change purposefully and that practitioners should build on the “higher order skills” that will continue to be necessary, albeit for an increasingly different reason, in a world increasingly dominated by machines.

Perhaps the single most common ground between academic and professional respondents is the concern for climate change and environmental responsibility. The participants from both industries considered the issues of climate resilience, sustainability and adaptive reuse as key focus areas for the next decade. The report indicates that while the processes and structures of education and institutions have been slow to develop, the discipline of architecture and its practitioners are becoming more aware of their environmental responsibilities, and that the sector must take a significant step to reduce its carbon footprint if the world is to meet its climate targets.

The responses to questions about instability in the world are also interesting. The role of the architect in the expansion was linked by the participants to world crises such as mass migration, housing deficit,

post conflict reconstruction and economic inequality. In order to make this a viable role at scale, the study of participatory and socially engaged housing design needs to far more systematically interface with the social sciences, policies, public administration, and community engagement in architectural education as it is now.[3]

The titles of the proposed futures, which include: Spatial Strategist, Human Habitat Designer, Place Steward, and Spatial Diplomat, are telling. They suggest that the respondent does not conceive of the architect vanishing as a profession, but rather transform him or herself into a much wider and more inclusive and more collaborative presence in the world. Intellectual challenges like Fuller's systems thinking support the vision, and his ideas predate many of the interdisciplinary requirements now faced by architects.[8]

Overall, the results indicate that the key change under way within architecture is less a change in technology and more a change in attitude. The profession is being invited to recalibrate the definition of an architect, from the designer of a single building to the integrator of multiple systems, facilitator of social process, and guardian of the built and natural environment over time.

6. Conclusion

6.1 Summary of Findings

This study explored the views of future generations of architects in the context of architectural education and practice from various international perspectives. The results show that architecture is in a period of transformation with tremendous technological development, climate change, global instability, economic difficulties and changing the needs of society.

A perceived disconnect between the architectural education and practice was a recurring theme with participants, especially in terms of being industry ready, technologically literate, and aware of current issues in the world at large. AI proved to be a boon and a burden: Participants recognized its potential for handling repetitive tasks and making data-driven decisions, but also stressed the irreplaceable value of cultural sensitivity, empathy, and human judgment. The top priorities for the next 10 years were determined to be climate adaptation, sustainability, affordability, and social responsibility.

The study indicates that the emerging role of the future architect is that of a systems-thinker, an environmental steward and a social facilitator, as well as a designer of individual buildings. So rather than any specific technology breakthrough or design trend, the profession's ability to adapt responsibly to the increasingly complex and interconnected world seems to be the defining factor of the future of architecture.

6.2 Limitations

There are some caveats to be noted. Firstly the size of the sample is fairly small, which makes the results of the study less generalisable throughout the global architectural profession. Secondly, the participation was voluntary, responses may be subject to self-selection bias, with respondents who strongly felt about the survey issues more likely to respond. Third, the respondents came from a small number of countries, all of which are generally considered to be economically developed. Views expressed here are not necessarily representative of the Global South, the post-conflict space or the quickly urbanising economies. Lastly, the research is based on perceptions and not necessarily on what professionals actually do differently, and the perception of change may not be the same as the actual change.

Evaluation of the research gaps and future directions for research.

The following areas could be explored in future investigations:

- Case studies of architectural education systems and outcomes in the region/cross-cultural differences

In what ways and for what purposes is AI integrated into design studios and what does this mean for teaching?

Avoid programmatic structures, instead opt for expanded professional identity through post-conflict and humanitarian architectural practice.Don't use programmatic structures, and seek expanded professional identity in post-conflict and humanitarian architectural practice.

- Awareness of climate adaptation strategies and their inclusion in the requirements of professional licenses

The rise of new professional careers at the intersection of architecture, urban planning and environmental science.

The connection between licensing systems and professional examination systems and educational reform.

Such research would provide a more complete and geographically representative picture of how architecture is reacting to the 21st century conditions around the world.

References

1. Frampton, K. (1983). Towards a critical regionalism: Six points for an architecture of resistance. In H. Foster (Ed.), *The Anti-Aesthetic: Essays on Postmodern Culture*. Bay Press.

2. Fathy, H. (1986). *Architecture for the poor: An experiment in rural Egypt*. University of Chicago Press.

3. Aravena, A. (2016). *Reporting from the Front*. Venice Architecture Biennale.

4. Kolarevic, B. (Ed.). (2003). *Architecture in the digital age: Design and manufacturing*. Spon Press.

5. World Green Building Council. (2023). *Building the transition to net zero carbon*. WGBC. https://www.worldgbc.org

6. Ratti, C., & Claudel, M. (2016). *The city of tomorrow: Sensors, networks, hackers, and the future of urban life*. Yale University Press.

7. Pallasmaa, J. (2012). *The eyes of the skin: Architecture and the senses* (3rd ed.). John Wiley & Sons.

8. Fuller, R. B. (1969). *Operating manual for spaceship earth*. Southern Illinois University Press.

9. UN-Habitat. (2022). *World cities report 2022: Envisaging the future of cities*. United Nations Human Settlements Programme. https://unhabitat.org