

# Exploring the Aesthetic Principles of Traditional Lingnan Architecture in Guangzhou Influencing Economic Development and Socio-economic Perspective—A Notch from Public Well-being and Modernity

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**Citation:** Yi, K., & Xu, Z. (2023). Exploring the Aesthetic Principles of Traditional Lingnan Architecture in Guangzhou Influencing Economic Development and Socio-economic Perspective—A Notch from Public Well-being and Modernity. *Journal of Information Systems Engineering and Management*, 8(3), 22838. <https://doi.org/10.55267/iadt.07.13843>

## ARTICLE INFO

Received: 10 May 2023

Accepted: 12 July 2023

## ABSTRACT

Architecture plays a pivotal role in shaping the built environment and influencing societal development. Aesthetic principles of architecture, technological integration, and skill development are key factors that impact architectural design outcomes and broader societal implications. The purpose of this research is to look into the impact of architectural aesthetic principles on socioeconomic development, public well-being, and architectural modernism, while also looking into the mediating role of technological integration and the moderating role of skill development. A quantitative research approach was adopted, using a cross-sectional design. Data was collected through a structured questionnaire from 375 architects in Guangzhou, representing diverse architectural practices. SPSS was used for descriptive and inferential statistical analyses such as correlation, regression, and mediation analysis. The study revealed a positive relationship between aesthetic principles of architecture and socio-economic development, indicating that aesthetically pleasing designs can foster economic growth and urban development. Moreover, aesthetics significantly influenced public well-being, with thoughtfully designed spaces positively impacting the emotional and psychological well-being of users. Aesthetic principles were found to contribute to architecture modernity, inspiring innovative design practices. Technological integration emerged as a mediator, highlighting its role in translating aesthetic concepts into sustainable design solutions that impact socio-economic development, public well-being, and architecture modernity. Skill development was identified as a moderator, enhancing the integration of aesthetics and technology in architectural design. This study advances the understanding of the interplay between aesthetics, technology, and skill development in architectural practice. The findings offer practical implications for architects, policymakers, and educators, guiding the creation of aesthetically-driven, sustainable, and socially impactful designs. The study contributes to architectural theory and practice, fostering a holistic approach toward the creation of built environments that enhance the quality of life for individuals and promote sustainable development. The use of self-reported data and cross-sectional methods are the potential limitations of the study.

**Keywords:** Technological Integration, Aesthetic Principles, Skill Development, Socio-Economic Development, Public Well-being.

## INTRODUCTION

Architecture holds a position of significant relevance in society, encompassing far-reaching implications that extend beyond mere structural constructions. It plays a pivotal role in shaping the built environment, contributing to the formation of cityscapes and landscapes that define the visual

identity of communities (Berquist et al., 2022). Moreover, architecture goes beyond the physicality of buildings; it profoundly influences human experiences and interactions with spaces, impacting various aspects of daily life and societal dynamics. Central to the understanding of architecture is the concept of aesthetic principles. In the

context of architecture, aesthetics refers to the artistic and visual qualities of a building or space (Ali & Mustafa, 2023). These qualities include considerations such as form, proportion, balance, harmony, texture, color, and the thoughtful use of materials. But beyond these elements, architectural aesthetics delve into deeper dimensions, embracing cultural, historical, and functional aspects. The combination of these disparate aspects creates an architectural language that communicates the society's values, beliefs, and goals (Xia et al., 2022).

Various architectural styles have risen and fallen throughout history, each reflecting the aesthetic choices and cultural manifestations of the moment. From the elaborate and ornate decorations of Gothic cathedrals to the sleek simplicity of modernist architecture, each has left an indelible mark on human consciousness and the perception of beauty in the built world (Davis, 2002). Throughout history, the primary focus of architecture has evolved in response to societal needs. In its earliest forms, architecture served utilitarian and symbolic purposes, providing shelter and reflecting the religious and cultural beliefs of the community. However, as societies progressed and human aspirations expanded, architecture's role evolved beyond functionality to encompass aesthetics as a vital aspect of design (Cao & AlKubaisy, 2022). The modern era marked a turning point, with architects embracing the idea that aesthetics and functionality are not mutually exclusive but rather complementary elements of good design (Hultman, 2022).

Architectural aesthetics is concerned with the visual and haptic elements that characterize the beauty and affective power of architectural design. It comprises a variety of components that all work together to affect how a structure or area looks overall, including form, scale, materials, colors, and spatial arrangement (Nawaz et al., 2023). This interaction of design elements reflects cultural, historical, and social contexts in addition to aesthetics. Architectural design may have a strong emotional impact on people and express meanings that go beyond simple functioning, influencing how people interact with a space (Wang et al., 2022). Modern technologies must be seamlessly included throughout the entire design process to qualify as technological integration in architecture (Nawaz & Guribie, 2022; Sandra Marcelline et al., 2022). These innovations improve a building's utility, sustainability, and overall efficiency. Technology plays a crucial part in a variety of sustainable technologies, such as energy-efficient systems and green solutions, as well as Building Information Modeling (BIM), which streamlines the whole lifecycle of a structure (Nawaz et al., 2022). The idea encompasses automated and Internet of Things (IoT) devices for smart building systems, digital manufacturing methods for delicate architectural features, and immersive technologies like VR and AR for visualization and simulation of user experiences (Gassar & Cha, 2021). The boundaries of architecture are also redefined through flexible designs that adapt to changing needs and creative structural solutions. Architectural wonders that are futuristic, user-centric, and environmentally responsible can only be made possible by technological integration (Silva et al., 2023).

The aesthetic principles of architecture play a pivotal role in influencing various aspects of society, including socioeconomic development, public well-being, and architectural modernity. For starters, architectural aesthetics help to community socioeconomic development by attracting investments, tourism, and economic activities (Chowdhury et al., 2021). Aesthetically pleasant and well-designed urban places can help cities project a favorable image, instilling pride in inhabitants and attracting businesses and investors. Second, architectural aesthetics have a significant impact on public well-being (Jahani & Saffariha, 2020). Thoughtful and aesthetically pleasing designs can improve overall quality of life by fostering physical and mental well-being through the creation of settings that elicit positive feelings and stimulate social connections (Šafárová et al., 2019). Furthermore, aesthetically pleasant spaces can reduce tension, anxiety, and sadness, resulting in higher overall happiness among inhabitants. Finally, architectural aesthetics are instrumental in achieving architectural modernity. Integrating aesthetic principles with contemporary design considerations, such as sustainability and technological advancements, allows for the creation of innovative, future-oriented structures that address the evolving needs of society (Cui et al., 2020).

### Research Gap

Despite the evident significance of aesthetics in architecture, there is a noticeable gap in the current research landscape. While it is well-known that well-designed spaces can positively benefit a community's socioeconomic development, there is a paucity of extensive quantitative research that shows specific links between architectural aesthetics and economic indicators (Weinberger et al., 2021). Understanding the economic consequences of aesthetics can help urban planners and policymakers build environments that promote economic growth and development. Architectural aesthetics and public well-being need greater study. Design aspects can affect mental health, community cohesion, and life happiness (Teixeira et al., 2023). Understanding these links could help architects and planners build settings that improve human well-being and life. Moreover, in the context of contemporary architectural challenges, such as sustainability, technological integration, and cultural representation, aesthetics emerges as a driving force in achieving architectural modernity (Cui et al., 2020).

### Purpose

The purpose of this research is to investigate the impact of architectural aesthetic principles on socioeconomic development, public well-being, and architectural modernism, while taking into account the mediating role of technological integration and the moderating role of skill development (Gullino et al., 2023). The study establishes numerous specific objectives to attain this goal. To begin, the study intends to investigate the relationship between architectural aesthetic principles and socioeconomic development, specifically how the use of aesthetics in architectural designs may help to economic growth, urban development, and overall societal improvement. Second, the study tries to examine the impact of architectural aesthetic principles on public well-being (Zhu et al., 2020). The research seeks to discover how architecture might positively

improve the well-being and quality of life of individuals and communities by investigating the emotional and psychological consequences of visually pleasant settings. Third, the study is to evaluate the impact of architectural aesthetic principles on architectural modernity (Given & Kuys, 2022). The research tries to determine how aesthetic factors influence the growth and advancement of architectural design through an examination of contemporary architectural trends and practices. The study will then investigate the relationship between architectural aesthetic standards and technological integration. The project strives to understand how aesthetics and technology intersect to produce innovative and sustainable architectural solutions by analyzing the incorporation of technology in architectural designs. Furthermore, the research will look into whether technological integration mediates the relationship between architectural aesthetic principles and socioeconomic progress, public well-being, and architectural modernism.

### Contribution

This study makes significant contributions to the fields of architecture, urban planning, and socioeconomic development by providing insightful knowledge and practical outcomes for many stakeholders. First, this study explores how aesthetic principles affect socioeconomic growth, public welfare, and architectural modernism. The findings show how aesthetics can boost architectural innovation, economic growth, and well-being. Second, the mediating role of technology integration emphasizes architectural sustainability. Understanding how technology connects aesthetics and socio-economic consequences helps architects include energy-efficient technologies and eco-friendly materials in their designs. Moreover, understanding the relationship between aesthetics and socio-economic development can empower policymakers and developers to invest in architecturally striking and culturally relevant projects. Aesthetically appealing buildings and urban spaces have the potential to attract investments, tourism, and economic activities, ultimately contributing to local and regional economic growth. In addition, the emphasis on public well-being highlights architecture's function in creating spaces that positively affect human experiences. Social cohesion, community engagement, and the general well-being of residents and visitors can be improved by designing buildings and public spaces with human-centered principles in mind.

## LITERATURE REVIEW

### Aesthetic Principles of Architecture and Socio-economic Development

Aesthetically appealing architectural structures have been found to play a crucial role in attracting tourism and investment to a region, acting as compelling landmarks that draw visitors and entrepreneurs (Coccia & Watts, 2020). Moreover, the presence of visually stunning buildings has been linked to increased property values in the surrounding areas, leading to greater tax revenues and contributing to overall economic growth (Chauhan & Garg, 2020). Beyond

economic benefits, architectural aesthetics have a direct influence on the livability and quality of life of residents. Well-designed public spaces and buildings foster a sense of community pride, social cohesion, and overall well-being (Zivan et al., 2022). Additionally, architectural aesthetics have been harnessed as a powerful tool for urban regeneration and revitalization efforts, breathing new life into declining urban areas and stimulating economic activity (Shen, 2023). Integrating cultural heritage and sustainability in architectural aesthetics not only enhances the symbolic and cultural significance of structures but also provides economic benefits through cultural tourism and cost savings in energy consumption and maintenance (Masoud et al., 2019). Moreover, aesthetically pleasing and inclusive public spaces can promote social inclusion and reduce economic inequality, fostering an environment conducive to innovation and entrepreneurship.

### Aesthetic Principles of Architecture and Public Well-being

Aesthetic considerations in architectural design go beyond the outward attractiveness of buildings and places; they have the capacity to impact individuals' and communities' emotional, psychological, and social experiences. Creating aesthetically beautiful and harmonious surroundings that generate positive emotions is one of the important ways in which architectural aesthetics contributes to public well-being (Mazzone & Khosla, 2021). Buildings and public spaces that are well-designed and integrate aspects such as proportion, rhythm, and balance can have a relaxing and uplifting effect on residents. Such spaces become conducive to relaxation, reducing stress and anxiety levels among users (Bertrand-Krajewski, 2021). Moreover, architectural aesthetics can enhance the sense of place and cultural identity, fostering a stronger connection between individuals and their built environment. Buildings that reflect local traditions and cultural heritage not only instill a sense of pride and belonging among residents but also attract visitors seeking to experience the authenticity of a place.

### Aesthetic Principles and Architecture Modernity

Aesthetic principles have played a significant role in shaping the evolution of architectural styles over time, influencing the way buildings and structures are conceived, designed, and experienced in the modern era. The concept of modernity in architecture challenged traditional norms, leading to the exploration of new materials, innovative forms, and functional simplicity (Benslimane & Biara, 2019). Modern architects, like Le Corbusier and Frank Lloyd Wright, sought to break away from historical styles and embrace minimalist aesthetics that aligned with the industrial Age's sensibilities. Thus, the application of aesthetic principles adapted to the changing social, technological, and cultural context, paves the way for architectural modernity (Shanthi Priya & Kalaimathy, 2022). In this pursuit of modernity, the emphasis shifted towards function and simplicity, as modernist architects prioritized the utilitarian aspect of design, embracing clean lines, open spaces, and efficiency. Technological advancements in engineering and construction allowed for the creation of bold

and innovative structural designs, where aesthetic principles became vehicles for conveying structural honesty and aesthetic innovation.

### **Aesthetic Principles of Architecture and Technological Integration**

Aesthetic principles, which have historically guided the visual and sensory aspects of architecture, now intersect with cutting-edge technologies, influencing the integration and application of advanced tools and techniques in architectural practice. Architects can now create highly detailed and realistic 3D models and renderings of their designs, allowing clients and stakeholders to visualize the final product before construction even begins (Huang et al., 2021). Additionally, parametric design, driven by algorithmic processes, has revolutionized architectural aesthetics, enabling the generation of complex and intricate forms that would be challenging to achieve manually. Technological integration has thus expanded the possibilities of architectural aesthetics, allowing architects to push the boundaries of creativity (Taylor et al., 2022). Moreover, technological advancements have empowered architects to incorporate sustainable design principles seamlessly into their aesthetic vision, fostering a holistic approach where beauty aligns with environmental responsibility. Digital fabrication technologies like 3D printing and CNC machining have further translated aesthetic principles into tangible reality with greater precision and efficiency.

#### **Technological Integration as a Mediator**

With advanced visualization tools and simulation software, architects can present their design concepts to potential investors and stakeholders in a more compelling and persuasive manner. This improves the chances of gaining financial support and attracting investment for architectural projects (Chauhan & Garg, 2020). Additionally, technology enables architects to optimize the design process, reducing construction costs and time, which contributes to the economic viability of projects and encourages further development in the region (Das et al., 2020). Moreover, sustainable design practices, often integrated with technological solutions, align with modern aesthetics and have the potential to attract environmentally conscious businesses and investors. Green buildings and energy-efficient designs not only contribute to a healthy environment but also result in long-term cost savings, favorably benefiting a region's entire economy (Chen et al., 2022). To adapt environments to the needs and preferences of users, smart and responsive technologies can be included in architectural designs. Lighting, temperature, and acoustic systems can be controlled to create comfortable and stress-reducing environments (Cao & AlKubaisy, 2022). Technology also facilitates the dissemination of knowledge about public spaces and cultural assets, enhancing visitor experiences and enhancing their awareness of and appreciation for architectural aesthetics. People and their built environment become more closely bonded as a result, which enhances a feeling of peace and general well-being.

Computational design tools, such as parametric design and generative algorithms, empower architects to create

complex and fluid forms that were previously unimaginable (Cao & AlKubaisy, 2022). By leveraging technology, architects can transform their aesthetic visions into dynamic and responsive structures that embody the spirit of modern architecture. Additionally, digital fabrication technologies have democratized the production of architectural elements, allowing for greater customization and experimentation in design. Architects can now translate their aesthetic principles into tangible reality with greater precision and efficiency, pushing the boundaries of creativity in architecture modernity (Ashkenazi, 2019). Furthermore, technology enables architects to integrate sustainable design principles seamlessly into modern architectural aesthetics, responding to contemporary environmental challenges. The integration of green technologies and energy-efficient solutions enhances the sustainability and relevance of modern architectural designs, aligning aesthetics with ecological responsibility.

#### **Skill Development as Moderator**

Aesthetic principles in architecture provide the foundation for design concepts and visual expression, while technological integration empowers architects to explore, simulate, and implement those concepts using advanced tools and methodologies (Kubota et al., 2019). A well-developed skill set in digital software and parametric design allows architects to leverage technology to its fullest potential, enabling them to experiment with complex geometries, explore innovative forms, and create aesthetically compelling designs. Moreover, architects with in-depth technical knowledge can effectively communicate design intent to engineers, contractors, and construction teams, ensuring that the use of technology aligns with the intended aesthetics (Yeatman & White, 2021). Skill development also plays a crucial role in integrating sustainability principles with aesthetic considerations. Architects with expertise in sustainable design can leverage technological tools to create environmentally responsible buildings that align with their aesthetic vision, achieving a harmonious blend of beauty and ecological responsibility (Goo et al., 2020). Additionally, skill development fosters effective communication and collaboration among multidisciplinary teams, promoting innovation and inspiring ideas that leverage technology to elevate aesthetic expressions. By combining expertise in aesthetic principles, technical proficiency, adaptability, and collaboration, architects can leverage technology's potential to create impactful and aesthetically compelling architectural designs (Kubota et al., 2019). Skill development, thus, plays a pivotal role in maximizing the transformative impact of technological integration on architectural aesthetics.

#### **Conceptual Framework and Hypothesis Development**

The conceptual framework for this study on the impact of aesthetic principles of architecture on socio-economic development, public well-being, and architecture modernity, with technological integration as a mediating factor and skill development as a moderating factor, is grounded in the interplay between architectural aesthetics, technology, and skill proficiency. The study postulates that aesthetic principles in architecture form the foundation for design concepts and visual expression, influencing the appeal and

functionality of buildings. Technological integration acts as a mediator, facilitating the implementation of aesthetic principles through visualization, simulation, and sustainable design practices. Additionally, skill development among architects is proposed as a moderating factor, influencing the extent to which technological tools are effectively harnessed to manifest aesthetic visions (**Figure 1**).

H1: Aesthetic principles of architecture positively influence socio-economic development.

H2: Aesthetic principles of architecture positively influence public well-being.

H3: Aesthetic principles of architecture positively influence architecture modernity.

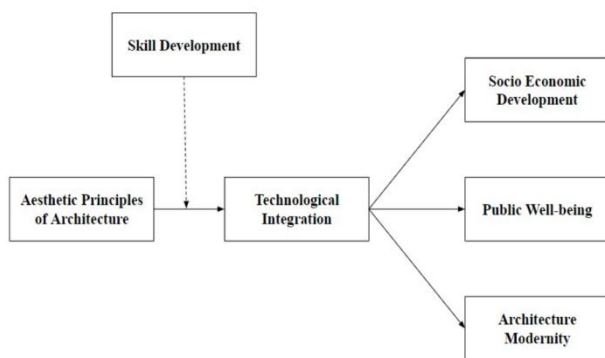
H4: Aesthetic principles of architecture positively influence technological integration.

H5: Technological integration mediates the relationship between aesthetic principles of architecture and socio-economic development.

H6: Technological integration mediates the relationship between aesthetic principles of architecture and public well-being.

H7: Technological integration mediates the relationship between aesthetic principles of architecture and architecture modernity.

H8: Skill development moderates the relationship between aesthetic principles of architecture and technological integration.



**Figure 1.** Conceptual Framework

## METHODOLOGY

This quantitative study examined the relationship between architectural aesthetics, technological integration, skill development, socio-economic development, public well-being, and architecture modernism. Cross-sectional research collected data from a sample of individuals at a certain period. This design enabled the examination of relationships between variables in a snapshot, providing valuable insights into the interplay of architectural aesthetics and technological integration in shaping various outcomes. Random sampling was selected as the sampling technique to ensure a representative sample of architects in Guangzhou, minimizing bias and enhancing the generalizability of the findings. A sample size of 375 architects was determined

through a calculation that considered the population size desired confidence level and margin of error, ensuring adequate statistical power for the study. Data was collected using a structured questionnaire, designed to measure participants' perceptions of aesthetic principles, technological integration, skill development, and their perceived impact on socioeconomic development, public well-being, and architectural modernity. The questionnaire employed closed-ended and Likert scale questions to gather quantitative data for analysis. The collected data was analyzed using SPSS software, applying descriptive statistics to summarize the characteristics of the sample and inferential statistical techniques such as correlation analysis, regression analysis, and mediation analysis to examine the relationships between variables and test the formulated hypotheses.

## Measures

Aesthetic principles were measured by using 5 items scale adopted from (Jennath & Nidhish, 2016). Public Well-being was measured by using 4 items scale adopted from (Mouratidis & Hassan, 2020). Socio-economic development was measured by using 5 items scale adopted from (K. Ahmed et al., 2021). Architecture Modernity was measured by using 3 items scale adopted from (Sun, 2023). Skill development was measured by using 4 items scale adopted from (Ahmed et al., 2020). Technological integration was measured by using 4 items scale adopted from (Hismanoglu, 2012)

## RESULTS

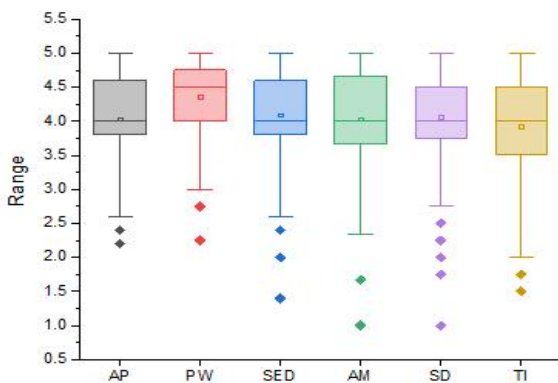
The aim of this study was to investigate the relationship between Aesthetic Principles, Public Well-being, Socio-Economic Development, Architecture Modernity, Skill Development, and Technological Integration. The descriptive data for six variables are presented in **Table 1** and **Figure 2**: Aesthetic Principles, Public Well-being, Socio-Economic Development, Architecture Modernity, Skill Development, and Technological Integration. These statistics provide useful information on the qualities of the data as well as the distribution of responses for each variable. Aesthetic Principles had an average rating of 4.03 out of 5 stars, with a moderate standard deviation of 0.62, indicating relatively consistent responses. In contrast, Public Well-being had a higher mean score of 4.37, with a low standard deviation of 0.50, indicating a narrower range of values. The average rating for Socio-Economic Development was 4.09, with a moderate standard deviation of 0.63, indicating some heterogeneity in participants' replies. The average rating for Architecture Modernity was 4.03, with a somewhat greater standard deviation of 0.76, indicating a broader variety of opinions. Skill Development received a 4.06 average rating with a 0.70 standard deviation, indicating very consistent but moderately diverse answers. Finally, Technological Integration received a 3.92 average rating with a 0.78 standard deviation, indicating more dispersed ratings. Each variable's skewness and kurtosis values reflect the form of its distribution. When compared to a normal distribution, certain variables have slightly negative skewness and

slightly flatter peaks (lower kurtosis), while others have slightly negative skewness and somewhat heavier tails

(greater kurtosis).

**Table 1.** Descriptive Statistics

	N	Mean	Std.	Mini	Maxi	Skewness	Kurtosis
Aesthetic Principles	374	4.03	0.62	1	5	-0.37	-0.136
Public Well-being	374	4.37	0.50	1	5	-1.00	1.49
Socio-economic Development	374	4.09	0.63	1	5	-0.75	1.40
Architecture Modernity	374	4.03	0.76	1	5	-0.82	1.27
Skill Development	374	4.06	0.70	1	5	-1.02	2.16
Technological Integration	374	3.92	0.78	1	5	-0.72	0.53



**Figure 2.** Descriptive Statistics

The results of the reliability study, which tries to analyze the internal consistency and reliability of the variables under inquiry, are presented in **Table 2**. The table includes critical information on the outer loading and Cronbach's alpha coefficient for each variable, offering light on the measuring scales' quality and coherence. Beginning with Aesthetic Principles, the investigation exposes five items: AP1, AP2, AP3, AP4, and AP5. The outer loading values represent the strength of each item's association with the latent construct (Aesthetic Principles). Notably, AP1 has a significant outer loading of 0.877, whilst AP2, AP3, AP4, and AP5 have moderate to good outer loadings of 0.605, 0.826, 0.762, and 0.709, respectively. The overall Cronbach's alpha coefficient for Aesthetic Principles is strong at 0.895, indicating that the scale has excellent internal consistency and reliability, confirming that these items accurately measure the construct of interest. Moving on, the variable Public Well-being consists of four items: PW1, PW2, PW3, and PW4. The outer loading values vary from 0.762 to 0.766, showing that the items have high connections with Public Well-being. The Cronbach's alpha coefficient for Public Well-being is 0.717, indicating that the measuring scale has excellent internal consistency and reliability. Similarly, Socioeconomic Development is made up of five categories with outer loading values ranging from 0.742 to 0.811. These values imply that the items and the latent concept have a decent to strong association. Cronbach's alpha for Socio-Economic Development is 0.761, indicating high internal consistency and dependability. Modernity in architecture is represented by three items: AM1, AM2, and AM3. The outer loading

values of 0.671, 0.776, and 0.680, respectively, show a moderate to strong association between the components and Architecture Modernity. Architecture Modernity has a Cronbach's alpha coefficient of 0.788, suggesting satisfactory internal consistency.

**Table 2.** Reliability Analysis

Variable	Items	Outer Loading	Cronbach's Alpha
Aesthetic Principles	AP1	0.877	0.895
	AP2	0.605	
	AP3	0.826	
	AP4	0.762	
	AP5	0.709	
Public Well-being	PW1	0.762	0.717
	PW2	0.766	
	PW3	0.630	
	PW4	0.732	
Socio-economic Development	SED1	0.742	0.761
	SED2	0.811	
	SED3	0.563	
	SED4	0.795	
	SED5	0.599	
Architecture Modernity	AM1	0.671	0.788
	AM2	0.776	
	AM3	0.680	
Skill Development	SD1	0.767	0.822
	SD2	0.712	
	SD3	0.661	
	SD4	0.613	
Technological Integration	TI1	0.656	0.831
	TI2	0.613	
	TI3	0.709	
	TI4	0.759	

**Table 3** and **Figure 3** summarize the findings of the correlation study, which sought to investigate the correlations between six variables: Aesthetic Principles (AP), Public Well-being (PW), Socio-Economic Development (SED), Architecture Modernity (AM), Skill Development (SD), and Technological Integration (TI). The correlations reveal the degree and relevance of the relationships between various variables. The correlation coefficient between Aesthetic Principles and itself is one, as expected given that it indicates the variable's correlation with itself. Moving on, the analysis

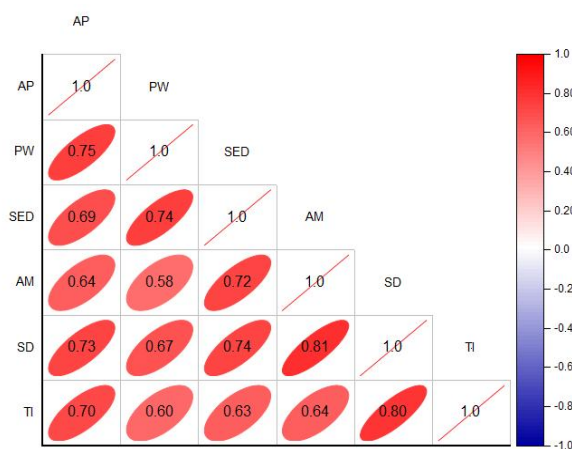
reveals significant positive correlations between Aesthetic Principles and the other variables: 0.752\*\* with Public Well-being, 0.694\*\* with Socio-Economic Development, 0.639\*\* with Architecture Modernity, 0.733\*\* with Skill Development, and 0.705\*\* with Technological Integration. All of these

correlations are highly significant at the 0.01 level (2-tailed), indicating that Aesthetic Principles and the other factors have substantial positive connections. Strong positive relationships are also seen among the other factors.

**Table 3.** Correlation Analysis

		AP	PW	SED	AM	SD	TI
AP	Pearson Correlation	1	.752**	.694**	.639**	.733**	.705**
	Sig. (2-tailed)		.000	.000	.000	.000	.000
	N	374	374	374	374	374	374
PW	Pearson Correlation	.752**	1	.743**	.579**	.666**	.596**
	Sig. (2-tailed)	.000		.000	.000	.000	.000
	N	374	374	374	374	374	374
SED	Pearson Correlation	.694**	.743**	1	.725**	.737**	.625**
	Sig. (2-tailed)	.000	.000		.000	.000	.000
	N	374	374	374	374	374	374
AM	Pearson Correlation	.639**	.579**	.725**	1	.808**	.638**
	Sig. (2-tailed)	.000	.000	.000		.000	.000
	N	374	374	374	374	374	374
SD	Pearson Correlation	.733**	.666**	.737**	.808**	1	.797**
	Sig. (2-tailed)	.000	.000	.000	.000		.000
	N	374	374	374	374	374	374
TI	Pearson Correlation	.705**	.596**	.625**	.638**	.797**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	374	374	374	374	374	374

\*\* . Correlation is significant at the 0.01 level (2-tailed).



**Figure 3.** Correlation Matrix

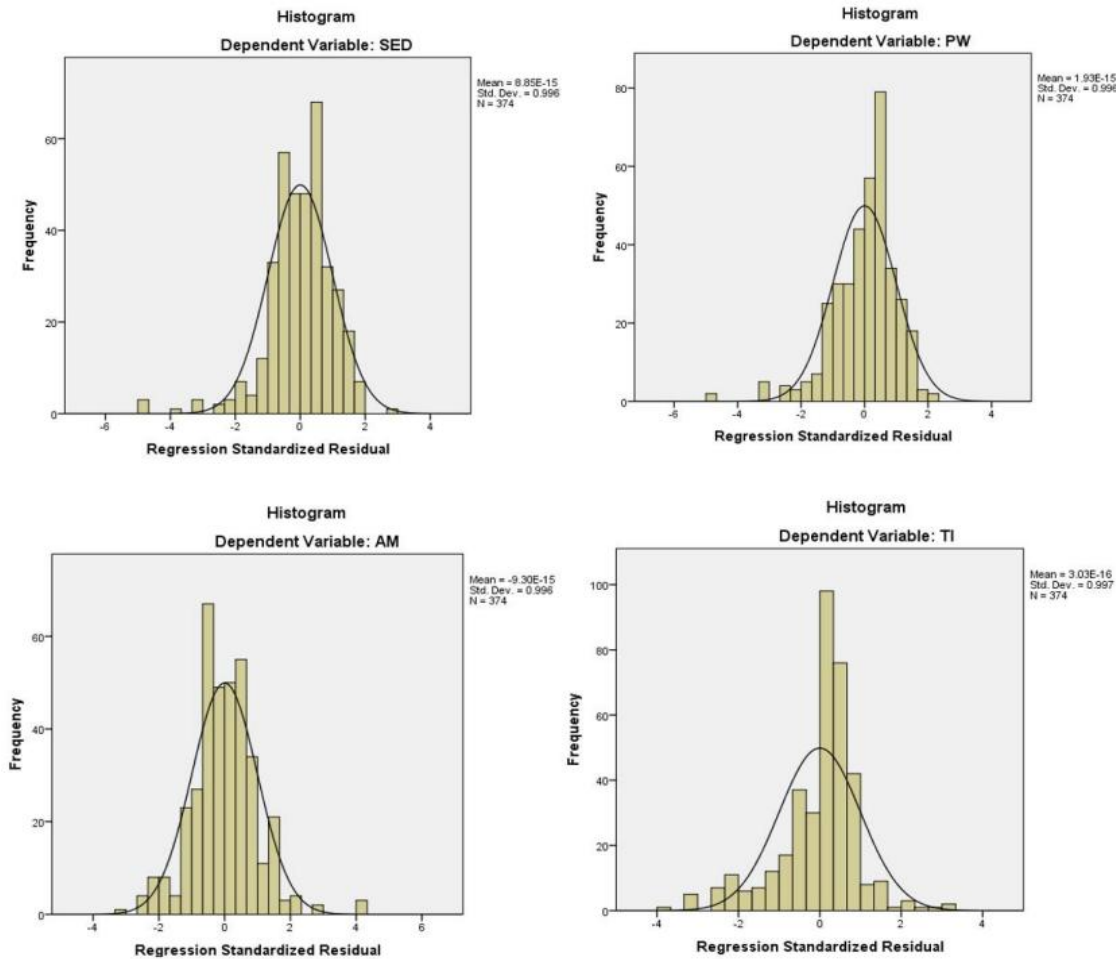
**Table 4** summarizes the findings of the regression analysis, which aims to investigate the relationships between Aesthetic Principles (AP) and their impact on four key variables: socioeconomic development (SED), public well-being (PW), architectural modernity (AM), and technological integration (TI). For each hypothesis, the findings are produced by examining the regression coefficients (BETA), t-values, and p-values. The first hypothesis (H1) investigates the link between Aesthetic Principles and Socio-Economic Development. This link has a regression coefficient (BETA) of 0.338 and a t-value of 6.563, showing statistical

significance. The 0.001 p-value confirms that this association is highly significant at the 0.001 (2-tailed) level. As a result, the hypothesis is accepted, indicating that Aesthetic Principles accurately anticipate changes in Socio-Economic Development. The second hypothesis (H2) investigates the link between Aesthetic Principles and Public Well-being. The results show a significant regression coefficient (BETA) of 0.602, a high t-value of 22.008, and an exceptionally low p-value of 0.001, indicating strong statistical significance. As a result, the hypothesis is accepted, demonstrating that Aesthetic Principles predict changes in Public Well-being significantly.

The third hypothesis (H3) investigates the correlation between Aesthetic Principles and Architectural Modernity. The study reveals a significant regression coefficient (BETA) of 0.782, with a corresponding t-value of 16.003 and a p-value of 0.001, indicating the statistical importance of this association. As a consequence, the hypothesis is accepted, implying that Aesthetic Principles predict changes in Architecture Modernity considerably. Finally, the fourth hypothesis (H4) looks into the connection between Aesthetic Principles and Technological Integration. The regression coefficient (BETA) for this association is 0.881, with a high t-value of 19.166 and an exceptionally low p-value of 0.001, indicating its statistical significance. As a result, the hypothesis is accepted, demonstrating that Aesthetic Principles predict changes in Technological Integration considerably (**Figure 4**).

**Table 4.** Regression Analysis

Hypothesis	Relation	BETA	T value	P value	Decision
H1	AP -> SED	0.338	6.563	0.001	Accepted
H2	AP -> PW	0.602	22.008	0.001	Accepted
H3	AP -> AM	0.782	16.003	0.001	Accepted
H4	AP -> TI	0.881	19.166	0.001	Accepted

**Figure 4.** Regression Analysis

**Table 5** shows the findings of the mediation study, which looks into the role of Technological Integration (TI) in mediating the relationship between Aesthetic Principles (AP) and three major variables: Socio-Economic Development (SED), Public Well-being (PW), and Architecture Modernity (AM). For each hypothesis, the analysis offers information on the regression coefficient (BETA), t-value, and p-value. Hypothesis H5 investigates the role of technological integration in mediating the relationship between aesthetic principles and socioeconomic development. This mediation effect has a regression coefficient (BETA) of 0.509 and a t-value of 0.908. This mediation analysis has a p-value of 0.001, showing that the role of Technological Integration in mediating the association between Aesthetic Principles and Socio-Economic Development is statistically significant at the 0.001 level (2-tailed). As a result, the hypothesis is accepted, implying that Technological Integration serves as an important intermediary between Aesthetic Principles and

Socio-Economic Development. Similarly, Hypothesis H6 investigates the role of technological integration in mediating the link between Aesthetic Principles and Public Well-being. The results show a regression coefficient (BETA) of 0.528 and a t-value of 2.756. The p-value of 0.006 indicates that Technological Integration's mediation function in the link between Aesthetic Principles and Public Well-being is statistically significant at the 0.006 level (2-tailed). As a result, the hypothesis is accepted, showing that Technological Integration serves as an important intermediary between Aesthetic Principles and Public Well-being. Finally, Hypothesis H7 looks at the role of Technological Integration in mediating the link between Aesthetic Principles and Architecture Modernity. The results show a regression coefficient (BETA) of 0.415 and a t-value of 6.839. The p-value for this mediation analysis is 0.001, demonstrating that Technological Integration's mediating role in the link between Aesthetic Principles and Architecture Modernity is statistically significant at the 0.001 level (2-tailed). As a result,



the theory is accepted, showing that Technological Integration serves as an important intermediary between

Aesthetic Principles and Architecture Modernity.

**Table 5.** Mediation Analysis

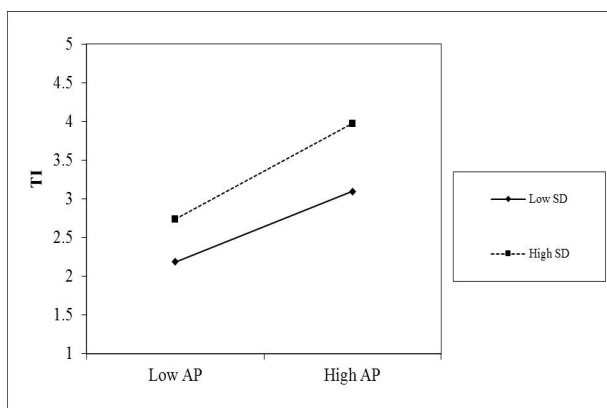
Hypothesis	Relation	BETA	T value	P value	Decision
H5	AP-> TI -> SED	0.509	0.908	0.001	Accepted
H6	AP-> TI -> PW	0.528	2.756	0.006	Accepted
H7	AP-> TI -> AM	0.415	6.839	0.001	Accepted

The results of the moderation analysis are presented in **Table 6** and **Figure 5**, which attempts to investigate the moderating effect of Skill Development (SD) on the link between Aesthetic Principles (AP) and Technological Integration (TI). For the specified hypothesis, the analysis offers information on the regression coefficient (BETA), t-value, and p-value. The moderating influence of Skill Development (SD) and Aesthetic Principles (AP) on

Technological Integration (TI) is investigated in Hypothesis H8. This moderation effect has a regression coefficient (BETA) of 0.081 and a t-value of 2.106. This moderation study has a p-value of 0.035, showing that the interaction effect of Skill Development (SD) and Aesthetic Principles (AP) on Technological Integration (TI) is statistically significant at the 0.05 (2-tailed) level. As a result, the hypothesis is accepted, showing that Skill Development modifies the link between Aesthetic Principles and Technological Integration.

**Table 6.** Moderation Analysis

Hypothesis	Relation	BETA	T value	P value	Decision
H8	SD x AP -> TI	0.081	2.106	0.035	Accepted



**Figure 5.** SD as Moderator Between AP and TI

## DISCUSSION

The aim of this study was to investigate the impact of aesthetic principles of architecture on socioeconomic development, public well-being, and architectural modernity. Furthermore, it explored the mediating role of technological integration and the moderating role of skill development. The findings of H1, which posits that Aesthetic Principles of Architecture positively influence Socioeconomic Development, are supported by substantial evidence from the literature. Architectural aesthetics play a pivotal role in driving economic growth and development within a region. Firstly, aesthetically appealing buildings and urban landscapes attract tourists and visitors, leading to increased economic activity in the form of spending on accommodations, dining, entertainment, and local businesses (Getz, 2000; Smith & Costello, 2019). Additionally, architectural aesthetics significantly impact property values, as buildings with attractive designs often command higher

prices in the real estate market, enticing investors and developers to invest in the area, and thereby stimulating further development and economic growth (Šafárová et al., 2019). Moreover, the incorporation of aesthetic principles in architectural designs fosters a stronger sense of cultural identity and place attachment among residents, contributing to community pride and social cohesion, which can create a conducive environment for economic activities (Gullino et al., 2023). H2 stated that incorporating aesthetic principles into architectural designs has a positive impact on public well-being. Numerous studies and theoretical frameworks that emphasize how the built environment affects people's emotional experiences and general well-being lend weight to this theory. According to environmental psychology research, people's psychological and emotional health can be strongly influenced by the design of physical environments, such as buildings and public areas (Warren, 2020).

H3 stated that incorporating aesthetic principles in architecture positively influences architectural modernity, indicating that aesthetically driven designs align with contemporary architectural expressions (Warren, 2020). The development of architectural styles and the acknowledgment of aesthetics as a key component of contemporary architecture lend credence to this notion. In order to prioritize functionality, simplicity, and a break from historical adornment, modern architecture evolved as a design trend in the late 19th and early 20th centuries (Fu et al., 2021). Aesthetic principles in modern architecture emphasize clean lines, minimalism, and the innovative use of materials, which are instrumental in shaping contemporary and forward-looking designs (Ke et al., 2022).

H4 stated that the consideration of aesthetic principles in architecture positively influences the integration and application of technology in the design process. This

hypothesis is supported by the interdependence between aesthetics and technology in modern architectural practice and the innovative use of technology to enhance architectural expressions (AlFadalat & Al-Azhari, 2022). Building Information Modeling (BIM) has revolutionized the design, construction, and management of buildings, emphasizing collaboration and integration between different disciplines. Aesthetic principles drive the design process within BIM, enabling architects to explore design alternatives and assess their aesthetic impact in real time, thus fostering the integration of aesthetics and technology (Agirbas, 2020).

H5 stated that technological integration acts as a mediator between aesthetic principles of architecture and socio-economic development. This mediation hypothesis is based on the assumption that the integration of technology in architectural design enhances the economic impact of aesthetics by facilitating visualization, simulation, optimization, and sustainable design practices (Yuan et al., 2023). Technological integration in architecture allows architects to create more informed and efficient designs. Through digital modeling and simulation tools, architects can visualize and present design concepts to clients and stakeholders, leading to better communication and understanding of the project. This, in turn, increases the likelihood of attracting investments and financial support for the proposed architectural projects (Benslimane & Biara, 2019).

H6 stated that technological integration acts as a mediator between aesthetic principles of architecture and public well-being. The hypothesis suggests that by using technology to implement aesthetic design features, architects can enhance occupants' emotional experiences and well-being (W. Wang et al., 2020). The integration of biophilic design elements, such as green walls and interactive water features, can be facilitated through technology. These elements have been found to positively impact individuals' stress levels and cognitive function, leading to improved well-being (AlFadalat & Al-Azhari, 2022).

H7 stated that technological integration acts as a mediator between aesthetic principles of architecture and architectural modernity, indicating that the integration of technology in architectural design is instrumental in realizing contemporary and innovative design expressions (Huang et al., 2021). Modern architecture is characterized by its embrace of technological advancements and innovative design solutions. The integration of technology in architectural practice has expanded the range of possibilities for design expression, allowing architects to create cutting-edge and iconic structures (Cao & AlKubaisy, 2022).

H8 stated that skill development among architects moderates the extent to which aesthetic principles are effectively translated into tangible architectural expressions through technological integration. Highly skilled architects possess a deep understanding of aesthetic principles and design concepts (Y. Wang et al., 2022). They can effectively translate artistic visions and aesthetic intentions into design ideas, ensuring that technology is applied in ways that align with the desired aesthetics (Kim & Cha, 2002). Architects with advanced technical skills are better equipped to

leverage digital tools and software for design exploration and analysis. Skillful architects can navigate parametric modeling, computational design, and BIM platforms to their fullest potential, enhancing the integration of technology in the design process.

## CONCLUSION

The purpose of this study is to look into the relationship between skill development, technology integration, architectural aesthetic principles, and the impact on socioeconomic development, public well-being, and architectural modernity. The findings have consequences for architectural practice, urban planning, and a larger understanding of architecture's role in society. The study establishes aesthetic principles' positive influence on socioeconomic development, emphasizing the economic value of investing in aesthetically beautiful construction. Architects can use this knowledge to advocate for the incorporation of aesthetic considerations in their designs, ultimately stimulating economic growth, attracting investments, and fostering vibrant communities. Moreover, the study highlights the mediating role of technological integration in realizing the impact of aesthetics on socioeconomic development and public well-being. By embracing digital tools, sustainable design practices, and smart technologies, architects can enhance aesthetic expressions and create innovative and user-centric architectural solutions. Furthermore, the moderating role of skill development among architects underscores the importance of continuous learning and expertise in maximizing the relationship between aesthetics and technological integration. Architects with advanced skills can effectively navigate the complexities of integrating aesthetics with technology, resulting in more impactful and socially relevant designs. The practical implications extend to the creation of aesthetically pleasing and socially engaging public spaces, which can promote community well-being and social cohesion. Additionally, the theoretical implications emphasize the significance of integrating aesthetics and technology in contemporary architectural practice, challenging traditional notions and advocating for a holistic design approach.

## IMPLICATIONS

The findings of this study hold significant practical implications that can greatly benefit the field of architecture and design. The study's primary practical implication is that it shows a clear connection between socio-economic progress and architectural aesthetic ideals. Architects and urban planners may clearly justify investing in the aesthetics of their projects based on the evidence that aesthetically pleasing structures and urban landscapes draw tourists and visitors, increasing economic activity. Architects may be able to boost local economies, draw in more enterprises, and raise property prices by putting an emphasis on aesthetics, which could have a good effect on a region's overall socioeconomic growth. Moreover, the study's insights into the mediating role of technological integration can be instrumental for

architects in enhancing their design processes. Understanding that technology plays a crucial role in translating aesthetic principles into tangible architectural expressions can encourage architects to embrace cutting-edge digital tools and software. By using parametric modeling, computational design, and Building Information Modeling (BIM), architects can refine their design concepts, test different variations, and optimize building performance. This can lead to more efficient and resource-effective design solutions, thereby fostering sustainable architectural practices. The construction of aesthetically beautiful public areas is another practical application.

In terms of theoretical implications, the study reinforces the importance of integrating aesthetics and technology in modern architectural practice. It underscores that aesthetic principles and technological advancements are not mutually exclusive but rather synergistic components that can enrich architectural design. This finding challenges the traditional notion that aesthetics and technology are separate domains and encourages architects to adopt an integrative approach to their work. Furthermore, the study highlights the moderating role of skill development among architects in maximizing the relationship between aesthetics and technological integration. Architects with advanced skills in design, digital tools, and sustainability can effectively navigate the complexities of integrating aesthetics with technology, resulting in more innovative and impactful designs. This emphasizes the importance of continuous professional development and education within the architectural community to stay abreast of technological advancements and design trends.

## LIMITATIONS AND FUTURE DIRECTIONS

### Limitations

This study's conclusions should be interpreted with various caveats. First, the research environment and sample size may limit generalizability. The study focused on architects in one region, so the results may not reflect global architectural practices and situations. Second, this study's cross-sectional design shows varied associations at a certain period. Longitudinal or experimental research may provide better causality and change insights. Thirdly, the data collected through questionnaires may be subject to self-report bias, where participants may provide socially desirable responses or have difficulties recalling specific experiences accurately. This potential bias could influence the accuracy and reliability of the responses obtained. Additionally, the measurement of aesthetic principles, technological integration, socio-economic development, public well-being, and architectural modernity may be subjective and open to interpretation, potentially introducing measurement errors and affecting the study's outcomes. The study's sample size may also be too small for some statistical analyses, despite efforts to find a suitable sample size, which could affect the study's statistical power and the capacity to identify smaller effects. Even if the study examines correlations across variables, proving causality in

observational studies can be difficult. Other unmeasured variables or reverse causality could be influencing the observed relationships, limiting our ability to draw definitive causal conclusions. Lastly, the assessment of skill development among architects may not fully capture the range and depth of expertise, as self-reported assessments may not reflect actual proficiency or capabilities accurately.

### Future Directions

To address these limitations and further advance our understanding, future research in this area should consider several directions. In the initial stages, longitudinal study designs might be used to look into the long-term impacts of aesthetic principles, technological integration, and skill development on socioeconomic growth, public well-being, and modern architecture. This method would give a more thorough picture of the dynamics and alterations that have occurred in these interactions throughout time. The findings may be more broadly applicable if the study was expanded to encompass a wider range of geographical areas and architectural styles. Comparative studies in different cultural, economic, and urban settings may reveal unique insights into the impact of aesthetic principles and technology integration. Furthermore, combining quantitative data from questionnaires with qualitative data from interviews or focus groups could offer a deeper understanding of the mechanisms underlying the relationships between variables and provide richer insights into the experiences of architects and building occupants. Objective measures, such as portfolio evaluations, performance assessments, or standardized proficiency tests, could be employed to more accurately assess architects' skill development and expertise. Moreover, experimental research designs could be used to explore causality more rigorously. Controlled experiments could manipulate the integration of aesthetic principles and technology in architectural designs and observe the effects on socioeconomic outcomes and public well-being. Lastly, in-depth case studies of specific architectural projects could provide a deeper understanding of the practical implications of the relationships between aesthetics, technology, and architectural outcomes in real-world contexts.

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