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The Evolution of Restoration Ideologies: The Emergence, Disappearance, and Revival of the Palatine Gate as an Urban Axis Node

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Abstract

This paper focuses on the Porta Palatina in Turin, Italy, analyzing its emergence, disappearance, and revival as a node of the urban axis. Using this as a central thread, it explores the evolution of restoration ideologies in Italy. Constructed in the 1st century BCE, Porta Palatina served as a crucial gateway to the ancient Roman city of Turin, marking the starting point of Caesar's Gallic Wars and the spread of Roman civilization. Over the course of Turin's urban transformation, the role of Porta Palatina as a city axis shifted through three distinct phases: from being a military and political center in Roman times, to being abandoned during the Baroque period, and finally, to its revival and rediscovery in modern times.

This study delves into the restoration journey of Porta Palatina, spanning from stylistic restoration in the mid-19th century to scientific restoration in the 20th century, and culminating in archaeological park design in the 21st century. It illustrates the transition of Italian restoration ideologies from Romanticism to modern scientific conservation. By examining restoration practices across different eras, this paper uncovers the interactions between restoration theory and culture, history, and technology. It emphasizes that restoration is not only an advancement in architectural techniques but also a respect for and preservation of historical culture. The restoration trajectory of Porta Palatina not only reflects changes in Turin's urban structure but also provides critical theoretical and practical references for global cultural heritage preservation.

Keywords: Porta Palatina, Turin, urban axis, restoration ideologies, cultural heritage preservation, Italian restoration theory

1. The Porta Palatina and the Birth of Turin's North-South Axis

Turin is a city distinct from other Italian cities. While Italian cities are rich in variety—Rome, the "Eternal City"; Florence, the "Athens on the Arno"; Milan, the "Fashion Capital"; and Venice, the "City of Water"—each with its unique characteristics, Turin stands out as less "Italian" in comparison. Its atmosphere diverges from the

lively and ornate urban spaces typical of Italian cities. As Mark Twain, the American traveler, marveled at the spaciousness of Turin's urban layout, which set it apart from other European cities. (Twain, M., 1880) Italo Calvino, a native writer, described Turin as a city that "encourages rigor and linearity." (Calvino, I., 1948) This is evident in its urban planning. Influenced by the Roman military camp (Castrum) and Baroque planning, Turin's streets are laid out in a grid of wide, straight avenues intersecting at right angles, creating orderly blocks. In the Roman Castrum plan, the main north-south street was named Cardo Maximus, while the main east-west street was called Decumanus Maximus. In the plain camp type, the intersection of these two roads initially hosted a square and an altar, used for military ceremonies and oaths.

The Porta Palatina is an ancient Roman gate located in the city center of Turin, within the present-day Parco Archeologia Torri Palatine.

The gate spans approximately 36 meters in width and 20 meters in depth, constructed entirely of early Roman red bricks. Its two towers stand about 25 meters high, with a diameter of around 7.7 meters, and feature a 16-sided plan. This gate is the oldest and best-preserved Roman gate and tower in the world, built during the reign of Julius Caesar in the 1st century BCE, making it over 2,100 years old. The gate was constructed during Caesar's tenure as governor of the Roman province of Gallia Cisalpina, serving as the city's northern entrance. From Turin, Caesar assembled his armies and launched the famous Gallic Wars. His Roman legions conquered vast territories across Europe, including present-day France, Luxembourg, Belgium, Germany, the Netherlands, and parts of Switzerland, even crossing the English Channel twice to land in Britain. The wars resulted in the deaths of a million Gallic and Germanic tribespeople.
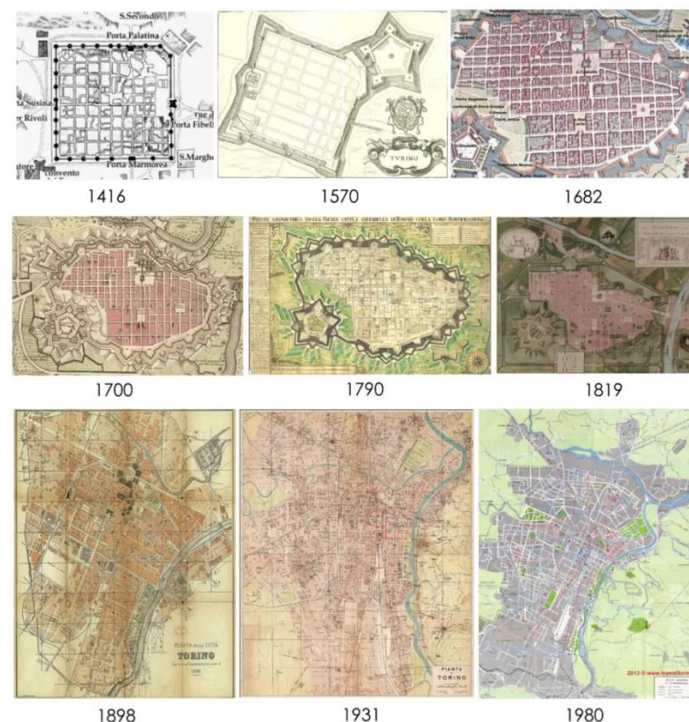
Figure 1. The Evolution of Turin's Urban Form from the 15th to the 20th Century

The victory in the Gallic Wars significantly influenced the course of Roman and Western history. In 1956, British Prime Minister Winston Churchill began his work *A History of the English-Speaking Peoples* with Caesar's invasion of Britain, stating that Caesar's landing marked the beginning of the history of all English-speaking nations. (Churchill, W. S., 1956)

As the strategic rear during Caesar's campaigns, Turin and the Porta Palatina became symbols of Caesar's achievements and the starting point for spreading civilization. Caesar's first three expeditions (between 58 and 56 BCE) all set out from the Porta Palatina. To the south of the gate stands a bronze statue of Caesar, gifted to Turin by Mussolini in 1935.

From the evolution of Turin's urban space, it can be observed that the Porta Palatina and the city's north-south axis underwent the following three stages: i) **From the 1st century BCE to the Middle Ages**: As a crucial gate for northern expeditions and defense, the Porta Palatina served as a key node on Turin's north-south axis. It marked the city's boundary and was adjacent to the residential areas of the nobility; ii) **During the Baroque period**: With the implementation of new urban planning, the Porta Palatina lost its role as a pivotal node on the city's axis. The "axis of power" shifted to Via Roma, while the "axis of transportation" was replaced by Via Milano. Over time, the area around the gate was gradually filled with residential buildings; iii) **From the late 19th century to the present**: The Porta Palatina underwent extensive archaeological excavations, renovations, and restorations, reflecting different phases in the evolution of Italian restoration philosophies. Over time, its cultural significance and status gained public recognition, transforming it into a new "historical axis."

1.1 From Ancient Rome to the Middle Ages: The Birth of the City Gate as a Node on the Urban Axis

Turin was settled by Celtic tribes (Celtico) around the 3rd century BCE, forming a settlement in the region of Gallia Cisalpina (note: the area south of the Alps and north of the Rubicon River was also known as Gallia Cisalpina). In the 1st century BCE, the Roman Republic occupied Turin and established a military camp (Castrum) to station troops.

The Roman military camp, or Castrum, was typically rectangular, surrounded by walls and moats, with tents or barracks inside. Over time, these camps evolved from settlements into towns and eventually into cities. Roman military camps had the following characteristics: i) A clear rectangular boundary defined by walls and ditches; ii) Standardized internal rectangular modules and a grid-like street layout, organized according to different military units; iii) Two main roads intersecting in a cross shape; iv) A central location for the forum, altar, and the Praetorian Guard's camp.

Many European cities, including Milan, Paris, and London, developed from Roman military camps. Well-preserved remnants of such camps include Aosta in northern Italy and Pozzuoli near Naples. However, most of these cities abandoned their rectangular layouts during the Middle Ages, becoming narrower and more chaotic. After the decline of ancient Rome, Turin was one of the rare European cities that maintained the standardized Roman grid-like urban planning (Barcelona's Cerdà Plan, for example, was only implemented in the 19th century). This continuity highlights Turin's unique urban morphology: from the Roman military camp, with its perpendicular streets defining rectangular blocks, through the medieval period of population decline and urban contraction, to the Savoy dynasty's extensive construction of geometric squares.
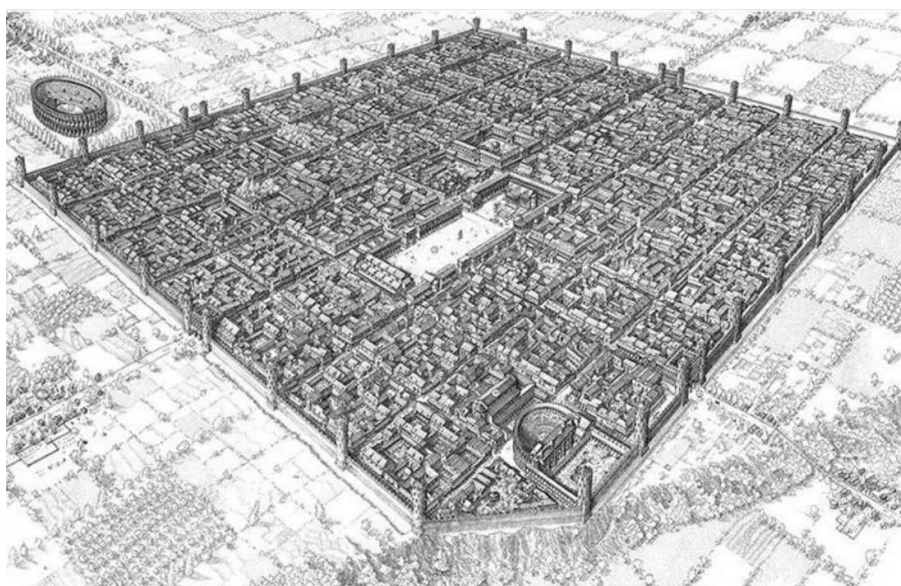

Figure 2. Torino (Augusta Taurinorum), a typical Castrum of the Roman period (Corni, F. (n.d.). Torino (Augusta Taurinorum). Archivio Francesco Corni. Retrieved March 25, 2025, from https://archivio.francescocorni.com/scheda/21373)

1.2 The Baroque Period: The Abandonment of the City Gate as a Node on the Urban Axis

The urban axis indicates the direction of a city's expansion. Both in the East and the West, settlements often formed outside city gates, where post stations and tax offices were located. Additionally, urban axes were often tied to the assertion of political and religious power. In the case of Roman military camps, the two main axes not only served defensive purposes and facilitated troop movement but also symbolized authority over the Gallic tribes through visual means such as symmetry.

Urban axes often shift due to the relocation of a city's center, profoundly impacting its spatial structure. For example, in 1267, Kublai Khan, the founder of the Yuan Dynasty, established the central axis of Dadu (modern-day Beijing) around the Taiye Lake northeast of the former Jin Dynasty capital, abandoning the axes of the Liao Southern Capital and the Jin Central Capital. Similarly, in Turin, during the Savoy period, the construction of the twin churches (Chiesa di San Carlo and Chiesa di Santa Cristina) and the Royal Palace of Turin created a new axis. The main gate of the Royal Palace aligned with Piazza San Carlo and the twin churches, and Via Roma was widened to become the new central axis of the city. This axis, connecting the palace, churches, and the city, can be referred to as the "axis of power." As the city expanded, a new heart-shaped wall with bastions encircled the old city from the Roman and medieval periods, and new gates were built west of the Porta Palatina. Under the planning of the Baroque architect Filippo Juvarra, Via Milano was widened to form a new axis, which

can be called the "axis of transportation." From this point on, the Porta Palatina lost its role as a node on the urban axis, and the surrounding area gradually became filled with residential buildings. However, this abandonment also ensured the preservation of the gate's main structure, making it one of the most intact ancient Roman gates in the world. Of the four ancient Roman gates in Turin, two were completely destroyed, one was transformed into a palace in the 14th century (the famous Palazzo Madama), and only the Porta Palatina remains well-preserved. (Ratto, S., 2015)

1.3 Architectural Typology of the Porta Palatina

Around the 1st century CE, Roman city gates in Gaul can be classified into two types:

i) **Fortress-type gates**: These were primarily located in newly conquered regions north of the Alps, where frequent rebellions and wars necessitated thicker walls and larger internal spaces for garrisoned soldiers. A representative example is the Porta Nigra in Trier, Germany.

ii) **Twin-tower gates**: These were mainly found south of the Alps, in what is now northern Italy. They featured tall twin towers and an inward-extending courtyard, with the Porta Palatina being a prime example. The Porta Palatina is the oldest and largest surviving twin-tower gate.

In terms of architectural typology, the Porta Palatina is similar to the Porta Leoni in Verona and the Porta Nigra in Trier, both of which belong to the fortress-type gate category.
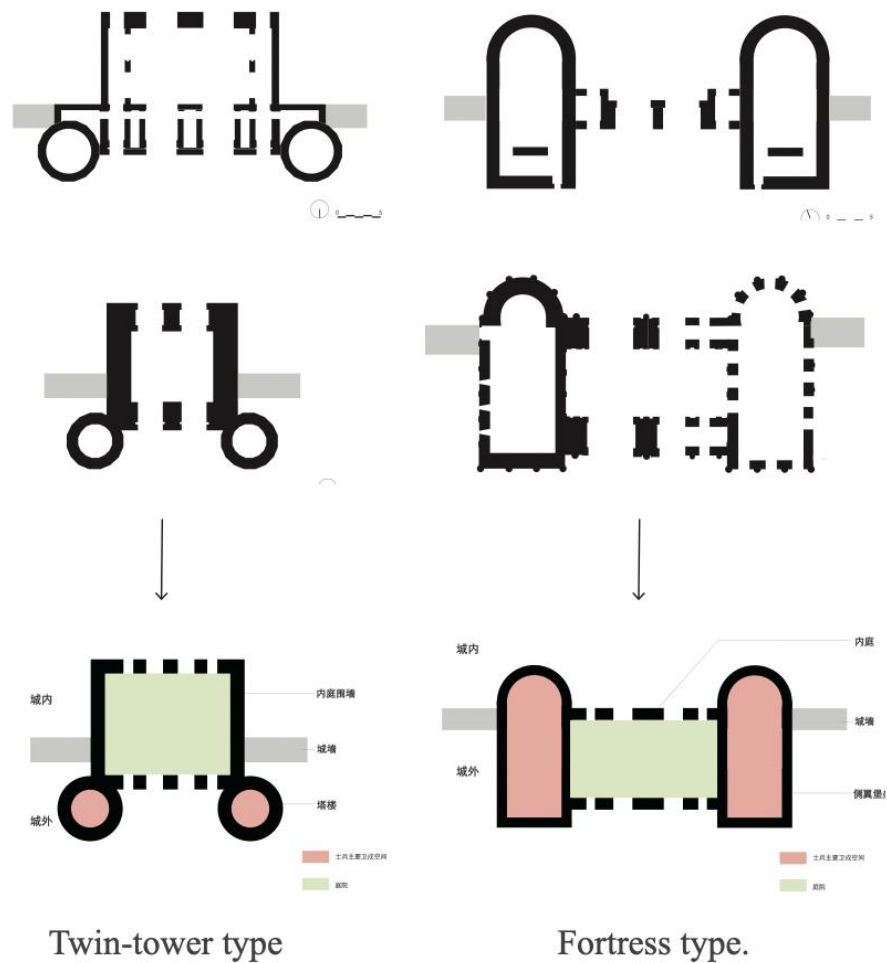
Figure 3. The two main types of Roman city gates in Gaul around the 1st century CE: twin-tower type and fortress type

The Porta Palatina is flanked by polygonal towers with staggered windows, enclosing an internal courtyard that served as a checkpoint for entering the city. Two larger archways allowed for the two-way passage of carts and horses, while smaller side archways were designated for pedestrians, creating a clear separation between vehicular and pedestrian traffic. The gate is constructed of red brick, with thin yet sturdy mortar layers, showcasing the Romans' advanced masonry techniques (*opus testaceum*). Such well-preserved ancient Roman towers are rare even in Rome itself. Of the more than 50 towers remaining in Rome, most were built during the Middle Ages and are relatively crude in construction, reflecting the chaotic family feuds of medieval Rome (e.g., the Colonna and Orsini families built towers to compete for territory, often engaging in archery battles; similar towers can be found in cities like Bologna and Pavia). Among these, the Tor de' Schiavi in Rome retains the most imperial

Roman character, as it was built on an octagonal base from the 3rd century CE. Unfortunately, only a fragment of its wall remains today. In contrast, the Porta Palatina stands as a unique example of such a complete and towering 1st-century BCE structure, unparalleled even on the Italian Peninsula, which is rich in Roman ruins.

Archaeologists have uncovered well-preserved remnants of the Roman road *Le strade di Iulia Augusta Taurinorum* (The Roads of Julia Augusta Taurinorum) at this site. The road surface is made of neatly cut, flat stones, with some slabs bearing clear ruts from cart wheels.

Since the 18th century, the gate has undergone three significant restorations, reflecting the evolving approaches to architectural restoration in Italy over time. These restorations provide a clear glimpse into Italy's exploration of architectural preservation. Key milestones include:

These efforts highlight the gate's enduring significance and the ongoing commitment to preserving its historical and architectural legacy.

2. The Rediscovery of the Axis Under the Evolution of Restoration Thought

The restoration history of the Porta Palatina reflects, to some extent, the turning points and crises in cultural heritage preservation. It demonstrates that Europe's well-established cultural heritage restoration system was not achieved overnight but evolved through the interplay of various historical ideologies and disciplines such as archaeology and art history.

2.1 "Stylistic Restoration": Promis and Gabetti (1866–1873)

In the early 18th century, the Porta Palatina was nearly demolished. Due to its obstruction of traffic, Duke Victor Amadeus II of Savoy planned to dismantle the gate. However, Antonio Bertola, the chief military engineer and architect of the duchy at the time, recognized the value of the structure and ultimately persuaded Victor Amadeus II to abandon the demolition plan. Instead, the gate was converted into a prison, built on the ruins of the Roman courtyard (*cavaedium*). The towering twin towers served as housing for the jailers, while the structure between the towers, resembling a barbican, functioned as the prison. (Ardissone, P., Bornaz, L., Turco, M. L., & Vitali, M., 2005)

By the early 19th century, Romanticism had gained popularity in literature and art, fostering a longing for past eras. Eclecticism (*eclettismo*) and historicism (*storicismo*) in architecture became prevailing trends, with figures like Viollet-le-Duc advocating for "stylistic restoration"—restoring structures to their original state, often summarized as "repairing the old as it was." In 1860, Vittorio Emanuele II, King of Italy, appointed the eclectic architects Carlo Promis and Carlo Gabetti to undertake the first restoration of the gate. After thorough research, they confirmed that the gate was indeed the northern entrance of Turin from the Roman era. By 1873, their restoration was complete, largely restoring the gate's original simplicity. They removed medieval additions such as rose windows, defensive *Bertesche*, and Ghibelline battlements (*merlo ghibellino*), cleared surrounding ruins connected to civilian buildings, and excavated the site to reveal the long-buried remains of the Roman road. The alignment of the Roman road coincided with the city's ancient axis. As Turin was then the capital of the Kingdom of Italy, this rediscovery heightened public awareness of the city's "historical axis," fostering a sense of historical pride among its citizens.

However, Promis and Gabetti also reconstructed the palace between the towers, a decision later criticized as excessive and lacking historical basis. This highlights a limitation of "stylistic restoration": restoration should not be based on historical imagination, nor should it erase traces of other eras. This critique, voiced by Alfredo D'Andrade, led to a second wave of intervention.

Figure 4. Comparison of the Porta Palatina Before (Left) and After (Right) the Restoration by Carlo Promis and Carlo Gabetti (1861–1873). Left: The gate before restoration (Source: ASAP©, Image Archive) Right: The gate after restoration (Source: ASCT©)

2.2 Scientific Restoration: Alfredo D'Andrade's Restoration in 1883

In 1883, architect Alfredo D'Andrade began the restoration of one of Turin's central landmarks—the Palazzo Madama in Piazza Castello. During this project, he pioneered a method that combined architectural and anthropological research, placing particular emphasis on construction techniques and authentic archaeological evidence. In 1891, he was appointed chairman of the Regional Monuments Restoration Committee for Piedmont and Liguria, where he initiated research on Turin's city walls and gates, with a particular focus on the Porta Palatina. Through detailed surveys and studies, he discovered that the ancient Roman sections of the palace between the two towers had been obscured by the reconstructions carried out during the 1860–1873 restoration. In 1903, after extensive discussions among experts, the Turin City Council unanimously decided to establish a special restoration committee with the goal of "fully revealing the original appearance of the ancient Roman gate." The second restoration, led by Alfredo, involved simultaneous archaeological excavation and restoration. During this process, the remains of the Roman courtyard (*cavaedium*) were uncovered, and the internal structure of the eastern tower was revealed through cross-sectional analysis, largely completing the understanding of the Roman-era internal layout. The restoration was meticulous and well-organized, earning high praise. (Brancati, L. E., 2015)

Alfredo D'Andrade was a master of Italian restoration. Born in Lisbon and a graduate of the École des Beaux-Arts in Paris, he designed and restored numerous historic buildings in Liguria, Piedmont, and the Aosta Valley, including the Sacra di San Michele in Turin (the inspiration for the monastery in Umberto Eco's *The Name of the Rose*), the medieval village within Turin's Parco del Valentino, and the Palazzo San Giorgio in Genoa. He also served alongside Camillo Boito as a member of the Milan Cathedral Facade Committee. (Pesando, A. B., 1999)

After the restoration, the two 16-sided polygonal towers were fully revealed, representing the pinnacle of masonry construction techniques during the Roman Republic. During the reign of Emperor Aurelian, the aesthetician Cassius Longinus summarized Roman aesthetics as "sublime" (Greek: *Peri Ypsous*; Latin: *sublimis*). Although the concept of the sublime was originally used to describe rhetorical texts, it undoubtedly hints at something more modern and profound.

In 1932, Italy passed its first **Cultural Heritage Protection Law**, drafted and revised by the renowned restoration theorist and architect **Gustavo Giovannoni**. This law later inspired the **Athens Charter**. Giovannoni introduced the concept of **"scientific restoration,"** which emphasized that architectural remains from different periods hold equal value and should be preserved accordingly. As the proponent of "scientific restoration," Giovannoni argued that architectural heritage serves as a historical document, and its most important role is to function as a **"documento"** (document). He believed that the relationship between historical buildings and contemporary development must address the balance between old and new. This could be achieved by adjusting functions to meet current needs without compromising the distinctive features of historical structures.

Alfredo D'Andrade's restoration philosophy aligned closely with Giovannoni's ideas, and his practices even predated the formal proposal of "scientific restoration." (Gustavo Giovannoni, 1913) This highlights D'Andrade's forward-thinking approach and his significant contribution to the field of architectural heritage preservation.

Little known is the fact that Le Corbusier, one of the main advocates of modernist architecture, visited Turin at the age of 16. In 1902, at the International Exhibition of Modern Decorative Arts (L'Esposizione internazionale d'arte decorativa moderna), the young Le Corbusier won a silver medal for a watch he designed. The exhibition was held in Valentino Park (Parco di Valentino) along the Po River. Within the park, the Medieval Village and Fortress (Il Borgo e la Rocca medievali), also known as the Medieval Street, is a group of historically inspired buildings designed by Alfredo D'Andrade. These structures were based on D'Andrade's extensive research into the architectural characteristics and construction techniques of ancient buildings in the Piedmont region. This experience in Turin, surrounded by D'Andrade's work, may have subtly influenced Le Corbusier's later architectural philosophy and designs. (Le Corbusier, 1923)
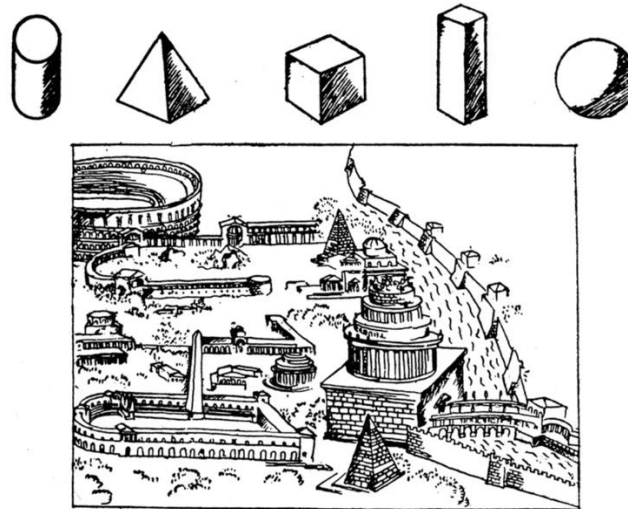
Figure 5. "The lessons of Roma" Le Corbusier, *Towards a New Architecture*

3. The Revival of the Porta Palatina as a "Historical Axis" After World War II

The development of cultural heritage conservation theory and practice underwent a significant turning point during and after World War II. The war caused extensive destruction of cultural heritage, with many historic cities reduced to rubble and their identities lost. In the post-war period, attitudes toward architectural heritage were often contradictory, leading to frequent issues in heritage conservation. On one hand, the concept of heritage protection expanded from individual buildings to encompass entire environments. On the other hand, emergency interventions on monuments and buildings were often carried out without careful research, resulting in the misuse of new materials, insufficient expertise, and hasty actions that caused irreversible damage.

In response, the academic community adopted a more conservative approach to restoration, seeking to update existing theories with new knowledge. A series of international charters and conventions on cultural heritage conservation were established through professional discussions, including the Venice Charter (1964), the European Charter of the Architectural Heritage (1975), and the Washington Charter (1987). The European Charter of the Architectural Heritage emphasized the immeasurable cultural value of architectural heritage, stating that its protection must become a primary goal of urban and territorial planning. The Washington Charter focused on the conservation of historic cities, advocating for the protection of historic centers as integral parts of the urban fabric and recognizing that "all historic cities in the world should be preserved, as history is a material for understanding social diversity."

In Italian academia, Cesare Brandi, in his 1963 book *Teoria del restauro* (*Theory of Restoration*), established two key principles: i) Restoration should respect the material, aesthetic, and historical integrity of artworks, employing a methodological approach to reinterpret them and carry out restoration from a future-oriented perspective; ii) Restoration should preserve the original emotional and historical traces of artworks, avoiding the invention of historical or aesthetic content and not erasing the marks left by time.

These principles have been widely accepted in the international restoration community and have had a profound impact. (Valentini–PhD, F., 2008)

Between 2003 and 2006, the Turin-based architectural firm DAR, consisting of Giovanni Durbiano, Luca Renerio, Aimaro Isola, **and** Eugenio Cupolillo, designed and completed the Parco Archeologico delle Torri Palatine (Palatine Towers Archaeological Park). (DAR_Architettura, n.d.) Their design was based on historical documents and archaeological materials, employing a subtle topographic strategy to reflect the medieval moat and Baroque-era bastion slopes. Red brick columns were used as enclosures,

complementing the Porta Palatina and the ancient Roman archaeological park. (Canevese, M., & Di Venti, M., 2014) The Roman Road uncovered by archaeologists, representing Turin's "historical axis," was integrated into the design through careful architectural interventions. Today, the site has become a major tourist attraction and urban landmark, drawing international visitors and highlighting Turin's rich historical legacy.

4. Conclusion

The restoration of the Porta Palatina, spanning over 130 years, reflects the evolution of restoration philosophies in Italy. As a significant relic of Turin's Roman era, the Porta Palatina has undergone multiple restorations, each mirroring the shifts in restoration theory and practice over time. From the stylistic restoration of the early 19th century to the scientific restoration of the mid-20th century, the evolution of restoration thought has been closely intertwined with advancements in architectural technology, as well as changes in culture, history, and public consciousness.

Restoration is not merely about reconstructing historical forms; it is also about respecting and preserving historical culture. Each wave of restoration philosophy, like ripples in water, has

matured through continuous debate and discussion. Early restoration efforts emphasized stylistic recovery, reflecting the Romantic era's longing for and imagination of the past. However, this approach often overlooked the multiple layers of history and the traces of time. With the development of restoration theory, the concept of scientific restoration emerged, emphasizing the preservation of the original appearance and historical traces of buildings and introducing more rigorous restoration standards.

The significance of the Porta Palatina as a node on the urban axis has evolved over time. As a key element of Turin's Roman-era urban axis, the gate has witnessed the transformation of the city's structure, highlighting the important role of architectural heritage in urban development. During the Baroque period, the city's center of gravity shifted, and the Porta Palatina lost its function as an urban axis. However, its historical value was rediscovered and redefined through subsequent restoration efforts. The restoration journey of the Porta Palatina is not only a testament to technological progress but also a reflection of evolving cultural identity, historical awareness, and the turning points in restoration philosophy.

Figure 6. Current State of the Porta Palatina

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Synergistic Impact of External Shading and Solar Control Films on Thermal Comfort and Natural Lighting in High-Rise Office Buildings in Jakarta

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Abstract

In tropical megacities like Jakarta, where high-rise commercial buildings dominate the skyline, managing solar heat gain while ensuring adequate natural lighting is a persistent architectural and environmental challenge. This study explores the synergistic application of external shading systems and solar control films as a dual strategy to optimize thermal comfort and daylight performance in high-rise office buildings. By integrating passive shading elements with spectrally selective window films, buildings can reduce indoor operative temperatures, cut cooling energy demand, and improve visual comfort without sacrificing daylight autonomy. Through simulation-based modeling using EnergyPlus and Radiance on a 30-story tower in Jakarta's Sudirman Central Business District (SCBD), the research evaluates three façade scenarios: base case, shading-only, and shading combined with solar control films. Results indicate that the combined strategy reduces annual cooling loads by up to 29%, improves thermal comfort conditions (PMV +0.4; PPD 8%), and maintains high daylight usability. Moreover, this integrated approach demonstrates favorable payback periods and aligns well with Jakarta's green building regulations and international certification frameworks such as LEED and Greenship. The findings advocate for wider adoption of layered façade interventions as part of sustainable urban design and energy-efficiency retrofitting in Southeast Asian tropical climates.

Keywords: external shading, solar control films, thermal comfort, high-rise office buildings, Jakarta, passive design

1. Introduction

In the dense urban fabric of tropical megacities like Jakarta, high-rise office buildings dominate the skyline as symbols of economic vitality and spatial efficiency. However, these towering structures present unique challenges in achieving energy-efficient, comfortable, and well-lit indoor environments. One of the most pressing issues is the intense solar exposure characteristic of the equatorial belt. In Jakarta, where average annual temperatures hover around 27–32°C and solar radiation intensity exceeds 4.5 kWh/m²/day, unprotected building façades are continuously subjected to significant

heat gain. This directly translates into increased reliance on mechanical cooling systems, thereby escalating electricity consumption and carbon emissions, and placing a strain on urban energy infrastructure.

The architectural trend toward fully glazed façades—often favored for aesthetic and daylighting purposes—has exacerbated these challenges. While large glass surfaces enhance daylight penetration, they also facilitate the ingress of infrared radiation, contributing to internal heat build-up and glare. This creates a paradox: increasing natural light often undermines thermal comfort, while aggressive solar control measures can lead to over-shading and insufficient daylight, thereby increasing dependence on artificial lighting.

Against this backdrop, passive and semi-active envelope interventions—such as external shading devices and solar control window films—have gained traction as sustainable solutions. External shading mechanisms, including horizontal louvers, vertical fins, egg-crate systems, and dynamic shading panels, can effectively intercept direct sunlight before it reaches the façade, reducing both solar heat gain and visual discomfort. Meanwhile, solar control films, which are typically retrofitted onto glass, serve as a selective barrier that filters ultraviolet (UV) and infrared (IR) radiation while allowing visible light transmission, preserving both thermal comfort and visual clarity.

When implemented synergistically, these two strategies can significantly improve building energy performance and occupant well-being. By mitigating solar heat gain at multiple layers—the external envelope and the glazing itself—they reduce cooling loads, maintain more stable indoor temperatures, and enhance spatial quality by balancing daylight access and glare control.

This paper critically examines the synergistic impact of external shading and solar control films in the context of high-rise office buildings in Jakarta. Drawing upon a mix of simulation models, field studies, and real-world retrofitting projects, it aims to demonstrate how such interventions can reconcile the dual objectives of thermal comfort and natural lighting, offering a replicable framework for tropical cities grappling with similar climatic and urbanization pressures.

2. External Shading: Cooling Without

Compromising Daylight

In the tropical context of Jakarta—where solar intensity is high, humidity is constant, and building density is ever-increasing—external shading emerges as a critical passive design strategy for improving indoor environmental quality. Unlike internal shading solutions such as blinds, curtains, or light shelves, external devices function as the first line of defense, intercepting solar radiation before it penetrates the building envelope. This significantly reduces the solar heat gain coefficient (SHGC) of façade systems, thereby lowering cooling loads, enhancing visual comfort, and mitigating thermal stress on glazing.

In Jakarta's high-rise commercial buildings, where façade design increasingly features large areas of glazing to maximize views and daylighting, external shading becomes particularly vital. Well-designed shading systems not only reduce operational energy demand but also play a major role in improving building envelope resilience, reducing wear on HVAC systems, and extending the overall lifecycle performance of the building.

2.1 Shading Typologies and Climatic Suitability

The performance of external shading systems is highly sensitive to orientation, geometry, and solar trajectory. In equatorial cities like Jakarta, where the sun follows a relatively high path across the sky year-round, horizontal devices—such as overhangs, projecting ledges, and fixed horizontal louvers—are effective on north- and south-facing façades, blocking midday solar ingress while allowing ambient daylight. However, east- and west-facing façades—which receive low-angle morning and afternoon sun—are best addressed with vertical fins or egg-crate systems that provide multidirectional shading.

Advanced solutions such as dynamic shading systems utilize motorized panels, electrochromic louvers, or kinetic façades that adjust in real-time based on solar position, daylight availability, or interior temperature conditions. These systems, though capital-intensive, offer superior adaptive control and are increasingly being piloted in premium-grade developments across Southeast Asia. Despite their technical promise, adoption in Jakarta remains limited by factors such as upfront cost, maintenance complexity, and technological capacity within the local building industry.

Thermal simulation models conducted on typical curtain wall buildings in Jakarta reveal that well-configured external shading can reduce solar heat gain by 30–60%, leading to a peak indoor operative temperature drop of 3–4°C. Such reductions translate to cooling energy savings of 10–25%, depending on envelope characteristics and mechanical system efficiency.

2.2 Visual Comfort and Daylighting Trade-offs

There exists a common concern that shading devices inevitably reduce interior brightness and restrict visual access. However, empirical studies and post-occupancy evaluations have demonstrated that intelligent shading design can enhance daylight quality rather than diminish it. By blocking direct sunlight while still admitting diffuse sky light, shading systems reduce glare and improve the uniformity of luminance, creating a more visually comfortable environment.

Metrics such as daylight autonomy (DA) and useful daylight illuminance (UDI) show favorable outcomes in shaded spaces when design is guided by solar geometry. For example, offices equipped with horizontal overhangs or angled fins maintain average illuminance levels between 2,300–2,700 lux, well above the minimum requirement for task lighting (typically around 300–500 lux). Furthermore, the glare index, a measure of occupant discomfort from high luminance contrast, drops significantly when shading is introduced.

Table 1. Performance of Different Shading Devices in a Jakarta-Based Simulation Model

Shading Device	Solar Heat Gain Reduction (%)	Avg. Illuminance (Lux)	Glare Index (Daylit Zones)	Cooling Load Reduction (%)
No Shading	0	3,200	19	0
Horizontal Louvers	43	2,650	13	15
Vertical Fins	38	2,400	12	12
Egg-Crate System	52	2,300	10	19
Dynamic Shading	61	2,700	9	25

2.3 Integration with Urban Morphology

In high-density urban environments like Jakarta's Sudirman Central Business District (SCBD), where buildings are often clustered with minimal spacing, the design of external shading systems must account for urban morphology and contextual solar dynamics. The phenomenon of urban canyoning, where adjacent buildings reflect and re-radiate sunlight onto each other, intensifies the need for localized shading analysis. In such contexts, external shading devices must be calibrated not only for direct solar gain but also for reflected radiation and sky view factor limitations.

An added benefit of high-density development is the potential for mutual shading, where adjacent structures partially protect each other from low-angle sun paths. This can be leveraged in shading calculations to optimize device size and minimize material use, reducing cost while maintaining efficacy. In some projects, shared solar geometry modeling has allowed designers to reduce shading projections by up to 20% without compromising performance.

Jakarta's evolving regulatory landscape is beginning to respond to these complexities. While existing codes remain largely performance-based, several green-certified developments are now incorporating integrated shading and green façade systems—vegetated panels that not only reduce solar gain but also contribute to urban biodiversity, air quality, and aesthetic appeal. These hybrid systems represent a growing interest in bioclimatic design principles that merge functionality with ecology.

3. Solar Control Films: Smart Glass for Smarter Buildings

As tropical megacities like Jakarta continue to urbanize vertically, the preference for glass-intensive façades in high-rise buildings has introduced a critical dilemma: how to allow abundant daylight without incurring excessive

solar heat gain. The equatorial sun, paired with Jakarta's high humidity and intense solar radiation, amplifies the need for façade systems that do more than just look modern—they must **perform**. **Solar control films**, also known as spectrally selective window films, have emerged as a cost-effective, minimally invasive technology that addresses this challenge. By selectively filtering the solar spectrum, these films reduce the heat and ultraviolet burden on interior spaces while maintaining high levels of visible light transmission—offering a balanced solution for both retrofitting and new construction.

3.1 Technical Functionality and Composition

At the heart of solar control films lies a multi-layered architecture composed of nano-engineered materials, including metallic oxides (e.g., titanium dioxide, silver, or indium tin oxide) embedded within polyester laminates. These layers are engineered to target specific wavelengths of solar radiation. Infrared rays (780–2500 nm), which account for over 50% of solar heat, are either reflected or absorbed, thereby minimizing internal temperature gain. Simultaneously, the films permit transmission of visible light (400–700 nm) to maintain natural illumination levels.

Advanced film technologies use dielectric stacks and low-emissivity coatings to improve thermal resistance without overly darkening the glass. Some high-performance variants also provide UV rejection rates exceeding 99%, significantly reducing risks of interior fading, glare, and material degradation. When applied externally, films may include weather-resistant topcoats that provide durability against Jakarta's intense rainfall and UV exposure, increasing their functional lifespan to 10–15 years.

3.2 Energy and Lighting Performance

Solar control films offer dual benefits: energy efficiency and daylight preservation. A comparative energy simulation by Riantini et al. (2024) in a Jakarta high-rise hotel demonstrated that applying low-E films to single-pane glass reduced annual cooling loads by 15%, a significant figure in the context of Jakarta's high energy costs and overburdened grid. More importantly, this reduction was achieved without compromising visual quality—films maintained over 68% daylight transmittance, ensuring that artificial lighting was not needed during peak daylight hours.

Films also contribute to improved thermal comfort, with measured reductions in Mean Radiant Temperature (MRT) of up to 2.5°C near glazed zones. In office settings where workspaces are often aligned with windows, this can have a measurable impact on occupant satisfaction and productivity. Further, by limiting solar glare and improving contrast ratios on screens, films help meet visual ergonomics standards set by WELL and LEED certification frameworks.
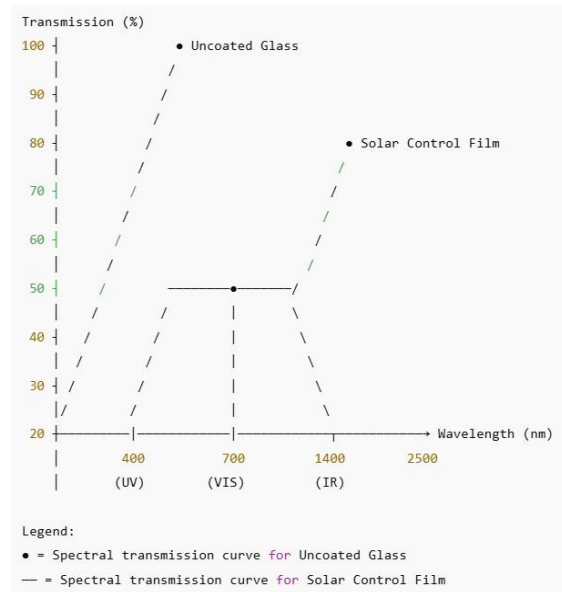
Figure 1. Spectral Transmission Profile – Solar Control Film vs. Uncoated Glass

3.3 Types and Application Scenarios

Different types of solar control films cater to varying building conditions, orientations, and design intents: Reflective Films feature metallic coatings that reflect a significant portion of solar energy outward. While effective for western façades and upper floors with intense afternoon sun, they can create mirror-like effects and are often restricted by aesthetic regulations or heritage overlays. Absorptive Films use tinted dyes or ceramic nanoparticles to absorb heat and reduce light levels. These are favored in historical buildings or lobbies where external reflectivity must be minimized for aesthetic coherence. Spectrally Selective Films balance energy rejection with high visible light transmission, offering an ideal solution for office zones and meeting rooms where daylight and outside views are critical.

Table 2. Comparative Properties of Solar Control Film Types

Film Type	IR Rejection (%)	Visible Light Transmission (%)	External Reflectivity	Typical Use Case
Reflective	80–90	10–25	High	West façades, upper floors
Absorptive	60–75	25–50	Low	Historical buildings, lobbies
Spectrally Selective	40–70	60–75	Moderate	Office zones, boardrooms

3.4 Retrofit Feasibility and Cost Efficiency

One of the most appealing aspects of solar control films is their retrofitting flexibility. Unlike double-glazing replacements or structural overhauls, films can be installed with minimal disruption to building operations, making them especially suited for occupied office towers. Installation usually requires no structural modification, and most projects can be completed within days per floor, depending on accessibility.

The capital costs of solar films are relatively modest—ranging from USD 25–80 per square meter—depending on film type and performance grade. With average energy savings of 10–20%, the payback period typically falls within 2 to 5 years, especially in high-consumption buildings. In Jakarta, where electricity tariffs for commercial properties are rising, this short-term return on investment makes solar films an attractive proposition.

Moreover, many films qualify under local green building incentive schemes, and their use can contribute points toward Greenship, LEED, or EDGE certifications, further improving building value and marketability. When paired with other envelope improvements such as external shading or ventilated façades, solar control films become a powerful tool for holistic façade performance enhancement.

4. Synergy of Shading and Films: The Jakarta Case

In high-performance building design, especially under the demanding climatic conditions of tropical megacities like Jakarta, the integration of external shading systems and solar control films represents a sophisticated strategy for improving envelope efficiency. While each technology independently addresses aspects of heat gain and glare, their combined application delivers multiplicative benefits across thermal performance, lighting quality, and operational energy use. As building performance requirements intensify under stricter environmental standards, especially in dense urban zones like the Sudirman Central Business District (SCBD), such synergistic solutions move from being optional enhancements to necessary design imperatives.

4.1 Complementary Mechanisms of Action

External shading and solar control films work through different but complementary physical principles. Shading devices are most effective in intercepting direct solar radiation, particularly during morning and afternoon hours when solar angles are lower and more oblique. Their role is primarily architectural, forming a passive barrier that modulates the entry of sunlight based on façade orientation and time of day. In contrast, solar control films operate on a material science level, filtering radiation after it reaches the glazing. These films target infrared and ultraviolet components, reducing radiant heat transfer and mitigating thermal discomfort near glazed surfaces.

When deployed together, these systems form a multi-tiered thermal barrier: shading reduces solar exposure and peak solar load, thus decreasing the stress on the films, while the films enhance the thermal resistance of the window system, even during hours when shading is ineffective (such as on cloudy days or on non-optimized orientations). Additionally, the dual system provides glare reduction without over-darkening, maintaining better daylight autonomy and uniform luminance within the indoor space. This synergy not only improves occupant comfort but also stabilizes lighting levels, reducing dependency on dimmable artificial lighting systems and contributing to both energy savings and visual health.

4.2 Jakarta-Based Performance Simulation

A performance-based simulation was conducted using EnergyPlus for thermal modeling and Radiance for daylighting analysis. The test subject was a 30-story office tower located in SCBD, designed with a curtain wall façade and high window-to-wall ratio—characteristics typical of Jakarta's commercial skyline. Three façade scenarios were evaluated: Base Case – Single clear glazing, no shading, no film. Shading Only – Combination of horizontal and vertical shading elements. Shading + Films – Shading integrated with high-performance spectrally selective window films.

Table 3. Annual Performance Metrics for Different Façade Strategies

Metric	Base Case	Shading Only	Shading + Films
Annual Cooling Load (MWh)	1,230	1,010	**875**
Solar Heat Gain Coefficient	0.68	0.47	**0.34**
Visual Daylight Autonomy (%)	64	60	**62**
Discomfort Glare Hours (hrs/yr)	730	420	**310**
Indoor Operative Temp (°C peak)	32.1	29.6	**28.2**
LEED Daylighting Points (est.)	1	2	**3**

Note: Simulations used Jakarta IWEC2 climate data and assumed typical office occupancy patterns (8am–6pm, Mon–Fri).

4.3 Thermal Comfort Gains

The dual-intervention system brought about marked improvements in thermal comfort metrics, particularly during Jakarta's peak summer months from August to October. The indoor operative temperature dropped by almost 4°C compared to the base case, pushing the conditioned space closer to the ASHRAE-55 thermal comfort zone. This not only reduces HVAC dependency but also enhances cognitive function and occupant satisfaction, both of which are critical in productivity-focused commercial buildings.

Comfort modeling using Predicted Mean Vote (PMV) and Percentage of People Dissatisfied (PPD) further illustrated the benefits:

Condition	PMV	PPD (%)
Base Case	+1.5	52
Shading Only	+0.9	25
Shading + Films	+0.4	**8**

4.4 Long-Term ROI and Urban Policy Potential

Although the upfront cost of integrating both shading and film systems is higher than single-strategy interventions, the combined approach proves more cost-effective over time. Based on Jakarta's energy pricing structure and HVAC operating costs, the payback period for the dual system is estimated at 4.2 years. This timeframe is favorable for commercial developers, particularly in premium-grade developments where long-term operational savings, tenant retention, and certification advantages are increasingly factored into return-on-investment calculations.

Furthermore, the synergy aligns closely with Jakarta's evolving urban sustainability goals. The city's green building regulation (PERGUB No. 38/2012) emphasizes passive envelope design and energy efficiency as prerequisites for development approvals in core business districts. Adoption of shading plus film strategies contributes positively toward Greenship, LEED, and EDGE certifications, which are now actively promoted through local planning incentives and utility rebates.

Looking ahead, integrated façade solutions like this one will become a cornerstone of Jakarta's climate resilience agenda, especially as building performance mandates become more stringent under the influence of national and ASEAN-level environmental accords.

5.   Challenges   and   Implementation Considerations

5.1 Architectural Constraints and Aesthetic Preferences

One of the primary barriers to the implementation of external shading systems in Jakarta's high-rise buildings lies in the architectural preference for sleek, modern

façades. The dominant design language in the central business districts often prioritizes fully glazed exteriors for aesthetic and symbolic purposes, leading to resistance against the addition of shading elements which are perceived as visually intrusive or incompatible with branding goals. Developers are often hesitant to adopt external projections that may reduce floor efficiency or complicate the building's structural design, especially in premium towers. Retrofitting shading systems into existing buildings presents even greater challenges, as it may require significant structural reinforcement, particularly on upper floors where wind loads and lateral movement are considerable. As a result, despite their benefits, shading devices are frequently dismissed on the basis of perceived design trade-offs and engineering complexity.

5.2 Technical and Climatic Integration Challenges

The tropical climate of Jakarta imposes specific demands on building envelope systems, and this complexity extends to solar control films and shading devices. Films applied to the interior face of glazing may inadvertently cause condensation issues if the building lacks proper ventilation, especially during high humidity periods. Additionally, highly absorptive films can lead to uneven thermal loads across the glazing surface, increasing the risk of thermal stress fractures, particularly on older or non-tempered glass. Shading elements, while effective in principle, require meticulous orientation-specific design, and their effectiveness can vary depending on the urban context and neighboring structures. In dense city zones, reflected solar radiation from adjacent buildings and limited sky view further complicate daylight and shading strategies. These issues demand sophisticated simulation tools and modeling capabilities, which many local design firms are still in the process of adopting.

5.3 Policy and Regulatory Gaps

Although Jakarta has enacted green building regulations such as PERGUB No. 38/2012, which promotes energy-efficient design, enforcement remains inconsistent and largely incentive-based. Many developments treat energy efficiency standards as optional, driven more by marketable certifications like Greenship or LEED than by compliance mandates. There is a lack of structured pathways for retrofitting older buildings with passive envelope solutions, and coordination among government departments is often fragmented, leading to confusion during planning and permitting phases. Without a robust and enforceable framework that mandates or rewards passive design strategies, adoption remains voluntary and sporadic, particularly in non-premium market segments.

5.4 Economic and Market Dynamics

From an economic perspective, cost remains one of the biggest impediments to adoption. While solar control films are relatively affordable, large-scale external shading systems involve higher upfront costs and complex installation logistics. In a market where developers are often focused on rapid turnover and maximizing rentable space, the long-term operational savings of envelope upgrades are difficult to justify. Compounding this is the landlord-tenant split incentive issue: since tenants usually pay utility bills, landlords may lack motivation to invest in improvements that do not directly impact their bottom line. Without innovative lease models or cost-sharing mechanisms, energy efficiency measures often fall by the wayside in favor of quicker returns.

5.5 Performance Monitoring and Verification

Even when external shading and solar control systems are installed, few projects in Jakarta include post-occupancy evaluations or performance verification mechanisms. As a result, data on actual energy savings, thermal comfort improvements, and daylighting effectiveness is scarce. This lack of feedback undermines trust in passive design and inhibits future innovation. Without smart metering systems or integrated building management systems capable of monitoring façade performance, it is challenging for building owners to quantify benefits or make iterative improvements. This performance gap weakens the business case for envelope retrofits and stalls broader adoption across the urban landscape.

6. Conclusion

As Jakarta continues its trajectory toward vertical urbanization, the importance of developing high-rise office buildings that are both energy-efficient and human-centered becomes paramount. In tropical climates where solar radiation is intense and ambient temperatures are persistently high, the dual challenge of minimizing thermal load while maximizing daylight access is not just a design

concern—it is a socio-environmental imperative. This essay has explored how the strategic integration of external shading devices and solar control films offers a holistic and synergistic response to these twin challenges.

Both technologies contribute meaningfully to the enhancement of indoor environmental quality. External shading provides first-line defense by reducing direct solar incidence, limiting heat gain, and controlling glare without completely obstructing natural light. Solar control films complement this strategy by selectively filtering the solar spectrum, mitigating residual heat and ultraviolet transmission while preserving visual transparency. Together, they form a dual-barrier façade system that can significantly reduce cooling energy demand, improve thermal comfort, and enhance daylight usability in office environments.

Empirical data and simulation models from Jakarta-based case studies have demonstrated that this synergistic approach can yield impressive outcomes: cooling loads reduced by over 30%, indoor temperatures lowered by up to 4°C, and discomfort glare hours cut by more than half compared to baseline configurations. Moreover, these improvements have been achieved without compromising visual comfort or reliance on artificial lighting—critical factors in maintaining occupant productivity and satisfaction. Despite these benefits, adoption remains limited due to architectural conservatism, cost concerns, regulatory ambiguity, and a lack of performance monitoring infrastructure. Many developers continue to prioritize short-term economic returns over long-term operational efficiency, while tenants—who stand to gain most from improved comfort and lower utility costs—often lack the agency or incentives to advocate for envelope upgrades. These structural and economic misalignments must be addressed through targeted policy interventions, design education, and innovative lease models that align stakeholder incentives.

Jakarta's path toward sustainable vertical development will depend on how effectively passive design strategies can be mainstreamed into both new construction and retrofitting practices. This will require a paradigm shift in how building performance is measured, marketed, and valued. Architects must embrace integrative design thinking that blends aesthetics with performance, engineers must develop adaptive solutions that respond to Jakarta's evolving urban microclimate, and policymakers must enforce energy codes that reward verified outcomes rather than theoretical compliance.

External shading and solar control films represent more than just technologies—they embody a design philosophy that seeks balance: between light and heat, openness and protection, innovation and tradition. When thoughtfully combined, they not only enhance the performance of high-rise buildings but also contribute to a more resilient, livable, and environmentally conscious urban future for Jakarta.

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A Study on the Application of Integrated Ventilation Strategies Based on Wind Simulation and Solar Radiation Analysis in Low-Rise Residential Buildings in Manila

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Abstract

This study investigates the integration of wind simulation and solar radiation analysis in developing passive ventilation strategies for low-rise residential buildings in Metro Manila. Operating within a tropical monsoon climate, Manila presents complex microclimatic challenges—ranging from high humidity and seasonal wind shifts to intense solar exposure and urban heat island effects. By combining computational fluid dynamics (CFD) modeling with solar radiation mapping, this research explores how architectural orientation, building form, shading design, and envelope materiality can be coordinated to optimize natural airflow and minimize thermal gain. Two case scenarios—a standard social housing unit and an optimized prototype—were simulated using site-specific weather data. The results demonstrate that integrated strategies can improve air changes per hour by up to 250%, reduce operative indoor temperatures by over 4°C, and significantly enhance thermal comfort without mechanical systems. The paper concludes by outlining pathways for scalable, climate-responsive housing in tropical cities, emphasizing data-driven design, policy support, and community-oriented implementation.

Keywords: tropical architecture, passive ventilation, wind simulation, solar control, low-rise housing, CFD, thermal comfort, climate-responsive design, Manila, sustainable urban development

1. Introduction

Metro Manila, the capital region of the Philippines, lies within a tropical monsoon climate zone (Am) according to the Köppen classification. This climatic condition is characterized by high year-round temperatures, with monthly averages ranging between 26°C and 31°C, and relative humidity levels exceeding 75%. The annual climate cycle is defined by two dominant seasons: a wet season from June to November, influenced by the southwest monsoon (*Habagat*), and a dry season from December to May, dominated by the northeast monsoon (*Amihan*). These monsoonal patterns also dictate prevailing wind directions, with southwest winds (average 3–5 m/s) prevailing in the wet season and northeast winds (2–4 m/s) during the dry months.

These seasonal wind flows are critical to passive ventilation strategies in low-rise housing, as they provide the natural driving force for cross-ventilation. However, in dense urban zones of Metro Manila, such potential is often compromised by obstructive urban morphology. High-rise commercial developments, impermeable street grids, and haphazard zoning result in wind shadow effects, turbulence, and air stagnation zones, particularly within inner-block residential communities. Studies have shown that air speed within built-up districts can be reduced by up to 80% compared to open-field conditions (Villarin et al., 2018).

Another critical factor is the intensification of the urban heat island (UHI) effect. Due to high-density development, dark surface materials, and reduced vegetative cover, Metro Manila experiences an average nighttime temperature differential of 2–4°C between urban cores and surrounding peri-urban zones. This thermal buildup not only increases indoor temperatures at night but also disrupts natural convection cycles—trapping warm air and reducing nighttime ventilation effectiveness.

Moreover, the diurnal solar radiation profile in Manila exerts significant pressure on indoor comfort. The city receives an average solar insolation of 5.1–5.5 kWh/m²/day, peaking between 11:00 a.m. and 2:00 p.m., during which poorly shaded or poorly oriented residential units often experience solar heat gains exceeding 200 W/m² on east- and west-facing walls. Without adequate design intervention, this leads to a significant thermal lag, compounding discomfort in the late afternoon and early evening when wind speeds typically decline.

Microclimatic complexity is further heightened by localized variations in land use, such as informal settlements built along esteros (canals), which lack organized wind corridors and often use low-thermal-performance materials like galvanized metal sheets or plywood. These structures not only exacerbate internal overheating but also lack architectural features to harness seasonal breezes, increasing reliance on energy-intensive cooling appliances.

In this context, effective ventilation design cannot rely solely on macro-level climate data. A successful approach must consider site-specific microclimatic conditions, such as wind directionality at block level, solar exposure patterns throughout the day, shading from adjacent buildings, and even vegetation placement. The integration of localized wind simulation and solar analysis becomes a critical prerequisite to developing low-energy, climate-resilient housing strategies suitable for Manila's challenging tropical urban conditions.

2. Thermal Discomfort and Energy Stress in Low-Rise Residential Environments

In the context of Metro Manila's rapidly urbanizing environment, thermal discomfort has emerged as a defining condition for residents living in low-rise, high-density housing. These residential typologies—often built through a mix of formal and informal processes—typically lack access to engineered climate control systems and rely heavily on natural ventilation or low-cost electric fans, which are increasingly insufficient under intensifying urban heat.

Due to high year-round temperatures and humidity, the predicted mean vote (PMV) and adaptive comfort models regularly place indoor conditions outside the acceptable thermal comfort range. Studies conducted by the Philippine Green Building Council and De La Salle University found that daytime indoor temperatures in low-rise homes often exceed 34°C, particularly in units with poor shading and inadequate cross-ventilation. These temperature levels, combined with relative humidity over 70%, push occupants into zones of heat stress, impairing cognitive function, sleep quality, and long-term health—especially for children and the elderly.

The material composition of many dwellings further exacerbates thermal conditions. Commonly used materials such as concrete hollow blocks without insulation, metal roofing, and single-pane jalousie windows lead to rapid heat gain and slow heat dissipation. Roofs, in particular, have been found to be the most critical component in residential overheating, with roof surface temperatures reaching up to 60°C during midday. Without ventilation strategies or insulation, this heat radiates into living spaces well into the evening, a phenomenon commonly reported as *mainit kahit gabi* ("hot even at night") among residents.

In response, households are increasingly turning to mechanical cooling, particularly low-cost window-type air conditioning units. According to a 2022 market report by the Philippine Department of Energy, residential AC penetration in urban low-rise households has

risen from 13% in 2010 to over 30% in 2021. However, this growing reliance on active cooling raises major concerns. First, it places significant financial stress on households, especially those in the lower-middle income bracket (earning PHP 15,000–30,000/month), for whom electricity bills often consume 20–30% of monthly income during peak summer months. Second, it compounds the load on the already strained power grid, leading to increased emissions from fossil-fuel-based energy and periodic brownouts in peak demand periods.

Furthermore, building layouts are often space-constrained and poorly ventilated, with many units sharing party walls and lacking openable windows on more than one façade. This limits air change per hour (ACH) rates and restricts the possibility of natural cross-ventilation. In informal settlements or backlot extensions, the situation is more acute—ventilation paths are obstructed by neighboring structures, and the ambient air itself is often stale and heat-laden due to lack of airflow corridors.

From a systems perspective, the lack of regulatory enforcement and performance-based design criteria in housing construction has perpetuated thermally inefficient typologies. While green building standards such as BERDE (Building for Ecologically Responsive Design Excellence) exist, they are not applied to mass housing or low-rise urban dwellings. This institutional gap has allowed suboptimal housing stock to proliferate without accountability for indoor thermal performance.

In sum, the convergence of climatic heat stress, material inefficiency, spatial density, and limited policy frameworks has created a context where thermal discomfort is not episodic, but systemic. Addressing this challenge demands an integrative approach—one that moves beyond mechanical solutions and instead leverages climate-responsive architectural strategies based on wind and solar analysis, explored in the sections that follow.

3. Architectural Form and Orientation for Wind Optimization

In low-rise residential design, especially within the tropical climate of Metro Manila, architectural form and orientation play a decisive role in determining the success or failure of passive ventilation strategies. As wind remains the primary driving force behind natural airflow, aligning building elements with prevailing wind directions and site-specific airflow patterns becomes a core design priority.

Metro Manila experiences dominant seasonal wind flows driven by the Amihan (northeast monsoon) and Habagat (southwest monsoon), each bringing distinct ventilation potential. The northeast winds (November to May) tend to be lighter and more consistent, while southwest winds (June to October) bring higher velocities but are often interrupted by dense urban fabric and precipitation events. Therefore, orientation strategies must address both seasonal variability and the microclimatic effects of neighboring structures.

One of the most effective spatial strategies for wind optimization is building alignment along the prevailing wind corridor, ensuring that longer façades are perpendicular to dominant wind directions. For example, aligning housing rows northwest-southeast enables better airflow capture during both monsoonal seasons, maximizing cross-ventilation potential. This orientation becomes even more critical in compact housing developments where party walls and minimal side setbacks reduce opportunities for lateral air movement.

In terms of form, narrow-plan units (with high depth-to-width ratios) and dual-aspect layouts—with openings on at least two opposite walls—have shown significantly better airflow efficiency than single-aspect typologies. Simulations using CFD tools such as Autodesk CFD and OpenFOAM confirm that wind speed differentials between inlet and outlet façades of just 1.5–2.5 m/s can generate sufficient pressure to induce steady cross-ventilation, improving air change rates up to 8–10 ACH (air changes per hour) in well-designed low-rise units.

Roof geometry also influences wind interaction. In contrast to flat roofs, pitched or gable roofs can facilitate stack-driven ventilation, especially when paired with ridge vents or clerestory openings. Warm air rising under solar exposure is expelled through high-level vents, while cooler ambient air enters through low-level openings—creating a vertical ventilation loop particularly effective during periods of low external wind pressure.

At the block scale, urban porosity and wind corridors become critical. Staggered building arrangements, courtyards, and linear voids can act as air collection and acceleration zones,

channeling wind into residential interiors. The absence of such planning, as seen in informal settlements or overly densified developments, results in wind stagnation zones where ventilation becomes negligible even under favorable external conditions.

Material use also interacts with form. Buildings with lightweight, breathable façades—such as louvered wooden panels or perforated concrete blocks—enhance passive airflow while mitigating excessive heat gain. These materials, when integrated into façade and fenestration systems, allow for controlled air permeability without compromising security or privacy—two key concerns in low-income urban housing.

In practice, many of these strategies remain underutilized or improperly implemented in Metro Manila's housing developments due to the prioritization of lot maximization and construction cost efficiency. However, design precedents from pilot eco-housing projects—such as those by Habitat for Humanity or TAO-Pilipinas—demonstrate the feasibility and impact of wind-responsive orientation and form, with measurable improvements in indoor thermal comfort and reductions in electricity consumption for cooling.

Ultimately, optimizing architectural form and orientation is not only a design opportunity but also a climate justice imperative in rapidly urbanizing tropical cities. As the next sections explore solar interaction and simulation techniques, the goal remains clear: to build housing that breathes with the climate, rather than resists it.

4. Passive Solar Control Through Materiality and Shading Design

In the tropical climate of Metro Manila, solar radiation is a dominant driver of indoor thermal discomfort, particularly in low-rise residential buildings where passive ventilation alone may be insufficient to mitigate heat accumulation. An effective climate-responsive design must therefore not only facilitate air movement but also minimize solar heat gain through material selection and shading strategies. Passive solar control becomes an indispensable counterpart to wind-driven ventilation, forming the basis of an integrated thermal design approach.

Metro Manila receives high levels of solar radiation year-round, with peak global horizontal irradiance reaching 1000–1100 W/m² during midday in dry-season months. Direct solar exposure on external walls and roofs leads to surface temperatures rising to 55–65°C, especially on east- and west-facing façades. This results in significant thermal transmission through the envelope, particularly in lightweight and uninsulated structures—leading to increased indoor temperature peaks in late morning and afternoon hours.

To mitigate this, one of the most immediate strategies is the application of external shading devices. Horizontal overhangs and vertical fins, when dimensioned according to solar angles (using tools such as Ladybug or Ecotect), can block high-angle sun during peak hours while maintaining daylight penetration. For example, a 0.6 m fixed horizontal canopy on a north-facing window in Manila can block up to 80% of summer solar gain, reducing indoor operative temperature by up to 2–3°C without affecting ventilation.

Shading can also be achieved through vegetative strategies, such as vertical gardens, green trellises, or strategically planted trees. In pilot studies conducted by the University of the Philippines, vegetation-covered façades reduced internal wall temperatures by 4–6°C compared to bare concrete. When combined with permeable wall materials, vegetation contributes not only to shading but to microclimatic cooling via evapotranspiration.

Materiality further influences thermal performance. In low-cost housing, where insulation is often omitted, the thermal mass and emissivity of envelope components become critical. Light-colored, reflective coatings on roofs and walls (with solar reflectance index or SRI > 80) have been shown to reduce heat absorption significantly. For instance, replacing traditional dark metal roofing with white-painted corrugated sheets can lower interior ceiling temperatures by 6–8°C, particularly when paired with ventilation layers or air gaps beneath the roofing system.

Wall construction systems also impact passive solar control. Where cavity walls are not feasible, ventilated cladding systems or double-skin façades with louvered screens offer viable alternatives. These create buffer zones that dissipate absorbed solar heat before it enters the living space. In climates like Manila's, where diffuse radiation is also significant due to atmospheric moisture, shading must address both direct and indirect solar gain.

Moreover, the orientation and geometry of openings interact with solar exposure. Windows facing east and west receive low-angle sun and thus require more aggressive shading or reduced glazing ratios, whereas north- and south-facing openings (in the Philippine context) can be optimized for daylight and airflow with moderate solar risk. Operable, shaded louvers provide a flexible interface—balancing privacy, light control, and airflow.

It is also important to note that shading strategies must not obstruct cross-ventilation paths. Solid concrete canopies, if uncoordinated with window placement, may block airflow or create negative pressure zones. The use of perforated screens, movable awnings, or adjustable blinds enables adaptive control of both light and wind—especially useful in transitional seasons and in units with changing occupancy patterns.

In conclusion, passive solar control is not a supplementary gesture, but a primary design tool for thermal performance in tropical housing. When aligned with ventilation strategies, it enhances comfort, reduces cooling energy demand, and creates buildings that are in sync with their environmental conditions. In the next section, we examine how computational tools can simulate and optimize these strategies in tandem with airflow modeling to support evidence-based design in real projects.

5. Wind Simulation Techniques for Evaluating Building Performance

To design climate-responsive residential buildings in tropical urban settings like Metro Manila, computational simulation tools have become essential in evaluating how built forms interact with wind. Wind simulation techniques, particularly those based on Computational Fluid Dynamics (CFD), enable designers to visualize airflow behavior, assess ventilation effectiveness, and make informed design modifications before construction. In resource-constrained contexts, simulation becomes a cost-effective proxy for full-scale prototyping.

The primary objective of wind simulation in this context is to evaluate key performance parameters such as air velocity, pressure differentials, flow distribution, and Air Changes per Hour (ACH) within interior spaces. These indicators allow for precise quantification of ventilation adequacy, especially in complex, urbanized environments where airflow is obstructed or redirected by adjacent structures.

Among the most commonly used simulation platforms are Autodesk CFD, OpenFOAM, ANSYS Fluent, and Rhino/Grasshopper with the Butterfly and Ladybug plugins. These tools facilitate 3D airflow modeling under varying wind conditions, enabling the comparison of multiple design iterations. For instance, using OpenFOAM, a study on low-rise prototypes in Quezon City revealed that slight reorientation of window openings improved indoor wind velocity by 38% during southwest monsoon conditions.

A typical simulation process begins with the import of building geometry into the software, followed by meshing (discretization of volume into computational cells), assigning boundary conditions (e.g., wind speed, direction, inlet/outlet definitions), and solving the Navier–Stokes equations for incompressible airflow. The Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) provides site-specific annual wind roses, which are critical for defining realistic seasonal wind inputs.

Simulation studies in Metro Manila have shown that the majority of low-rise residential layouts perform sub-optimally under natural ventilation conditions due to poor inlet-outlet alignment, limited façade permeability, and insufficient vertical exhaust. CFD allows for visualizing dead zones, where airflow stagnates, and short-circuiting, where air exits the space before reaching deeper zones—two common problems in narrow-plan units.

Furthermore, simulation assists in testing micro-scale interventions, such as:

- Adding clerestory vents or ridge openings to enhance stack ventilation

- Introducing porous walls or vent blocks to enable airflow through partitions

- Modifying fence or boundary wall permeability to improve front-yard air entry

CFD can also be used to optimize building cluster arrangements. Studies conducted by Mapúa University showed that staggered block layouts with 8–10 m setbacks generated more consistent wind penetration and turbulence reduction compared to linear, tightly packed rows. In wind tunnel validation studies, these configurations yielded 20–25% higher internal

airflow velocities at pedestrian and occupant level (1.2 m height), indicating improved ventilation comfort.

However, CFD is not without limitations. High-fidelity models require extensive computational time and processing power, especially in transient simulations. Moreover, simplified models may overlook thermal buoyancy effects, humidity variations, and dynamic occupancy patterns. Therefore, wind simulation should be treated as one component in an integrated environmental analysis, best used in combination with solar radiation mapping and real-world weather datasets.

To bridge the gap between research and practice, simplified simulation workflows and training for local architects and planners are needed. Initiatives like the Design Against the Elements Program and university-based technical centers are starting to embed CFD into design curricula and low-cost housing research, but wider adoption remains limited.

In conclusion, wind simulation provides a critical evidence base for climate-responsive design, allowing practitioners to move from intuition to quantifiable performance. As simulation tools become more accessible and contextually calibrated, they hold the potential to transform how low-rise housing is conceived, especially in rapidly warming tropical cities.

6. Synthesis of Wind and Solar Parameters in Integrated Ventilation Strategy

The effective application of passive cooling in low-rise residential buildings in Manila depends not only on the independent optimization of wind and solar strategies, but on their synthesis into an integrated design framework. Both wind behavior and solar radiation are dynamic, context-specific phenomena that interact with each other spatially and temporally. A successful passive ventilation strategy must therefore mediate these forces to produce thermally balanced, airflow-enhanced environments, particularly under tropical urban conditions where heat and humidity co-exist with airflow constraints.

This synthesis begins with the overlapping spatial analysis of solar exposure and wind flow. Using environmental simulation tools—such as Ladybug Tools in Rhino-Grasshopper or Autodesk Insight—designers can generate solar radiation maps and wind pressure fields for building surfaces. These datasets inform critical design decisions regarding opening placement, orientation, shading, and building porosity. For example, a façade that receives high afternoon solar gain but also lies in the path of prevailing wind may require both solar protection and carefully modulated ventilation apertures—balancing heat rejection and airflow intake.

One key strategy is the use of operable shading systems—such as adjustable louvers, overhangs, or woven screens—that can block intense sunlight while still allowing airflow. In simulation studies of prototype units in Mandaluyong, configurations with angled perforated shading panels on west-facing openings reduced direct solar radiation by 65% while maintaining 80% of natural airflow potential compared to fully open windows. These hybrid systems are particularly effective in rooms used during peak heat hours, such as kitchens and upper-floor bedrooms.

Another integrative tactic involves aligning ventilation paths with shaded zones, ensuring that incoming air is as cool as possible. For example, pulling air through shaded front yards or vegetated setbacks helps reduce the enthalpy of incoming air, enhancing the cooling effectiveness of cross-ventilation. Conversely, air that passes over sun-heated surfaces may increase indoor thermal loads unless filtered or redirected. This requires zonal planning of site landscaping, open spaces, and neighboring massing to coordinate airflow and shading effects.

Roof design also plays a role in synthesis. Ventilated double roofs or solar chimneys can leverage both wind-induced suction and solar-induced buoyancy to enhance vertical air movement. A simulation-based case study by the University of Santo Tomas demonstrated that low-income prototype homes with combined ridge vent + solar collector units achieved up to 35% greater indoor airflow rates than single-opening systems under still-air midday conditions.

To ensure robust performance, design must accommodate diurnal and seasonal variation. During still, high-radiation afternoons in the dry season, solar control must dominate, while in humid monsoon evenings with cooler temperatures, maximizing airflow is the priority. This calls for adaptive, user-controllable systems—such as vent shutters or roll-up

shading membranes—that respond to real-time conditions. Integration of low-tech sensors or passive indicators can empower residents to modulate airflow and shading dynamically without complex controls.

Finally, synthesizing wind and solar data supports multi-objective optimization in parametric design workflows. Genetic algorithms in platforms like Galapagos or Octopus (used in Grasshopper) can evaluate hundreds of design permutations based on comfort indices (PMV, SET), daylight autonomy, solar gain thresholds, and ACH rates. These tools help identify non-obvious trade-offs and synergies, guiding designers toward high-performance, low-cost outcomes.

In conclusion, integrating wind and solar analysis is not a post-design validation step but a generative design method. By treating environmental forces as primary design drivers rather than external constraints, architects and planners in Manila can craft housing that is resilient, responsive, and energy-efficient by design. The next section applies these principles in simulated design scenarios to demonstrate their real-world feasibility.

7. Testing of Design Strategies in Metro Manila-Based Case Scenarios

To evaluate the practical effectiveness of integrated ventilation strategies combining wind simulation and solar radiation control, this study conducted a series of case-based design simulations rooted in the built context of Metro Manila. These tests aimed to validate how different combinations of form, orientation, materiality, and passive systems could improve indoor thermal comfort and airflow conditions in low-rise residential units—especially under constrained urban settings.

Two primary case scenarios were selected:

- Case A: A standard row-type socialized housing unit in Quezon City, based on actual blueprints from the National Housing Authority (NHA)

- Case B: A prototype dual-aspect corner unit with integrated passive design interventions, developed as a theoretical design model for evaluation

Both cases were subjected to environmental simulation workflows using Rhino-Grasshopper with Ladybug and Butterfly plugins. Site-specific weather data were imported from the EnergyPlus Typical Meteorological Year (TMY) file for Manila, and simulations were conducted for both dry and wet season scenarios.

Key Performance Parameters:

- Air velocity distribution at 1.2 m occupant height

- Air Changes per Hour (ACH) in living and sleeping areas

- Solar radiation on external envelope (kWh/m²/day)

- Indoor operative temperature (°C) under naturally ventilated conditions

- PMV (Predicted Mean Vote) for thermal comfort evaluation

Results:

Case A (baseline model):

- Mean indoor wind velocity: 0.14 m/s

- Average ACH: 2.1

- Peak wall radiation (west): 4.2 kWh/m²/day

- Peak operative temperature (3 p.m.): 35.6°C

- PMV range: +2.2 to +2.6 (hot to very hot)

Case B (optimized model with integrated strategy):

- Mean indoor wind velocity: 0.39 m/s

- Average ACH: 7.8

- Peak wall radiation (west, shaded): 1.6 kWh/m²/day

- Peak operative temperature (3 p.m.): 31.1°C

- PMV range: +0.8 to +1.4 (slightly warm to warm)

Notably, Case B maintained ACH above 5 even during still wind conditions, due to roof-vent interaction and thermal stack effects, supported by solar chimney integration. Wind vectors indicated efficient cross-ventilation in living zones and upward exhaust in sleeping areas, aligning with daily use patterns. Solar shading, meanwhile, reduced late-afternoon heat build-up, enabling interior spaces to cool more rapidly during the evening.

Residents in comparable built units (from interviews in similar nearby housing projects) reported high afternoon discomfort and electric fan use for at least 6–8 hours daily, reinforcing

the need for passive solutions.

These results demonstrate that composite strategies—rather than singular interventions—offer the most robust performance, particularly when customized to the microclimatic conditions of Metro Manila. Furthermore, performance gains were achieved without mechanical systems, indicating potential for low-cost, low-tech solutions in future social housing development.

The process also highlighted the importance of simulation in early-stage design. Iterative adjustments in window geometry, opening placement, shading length, and roof form were made based on simulation feedback, enabling optimization that would not be intuitive through rule-of-thumb approaches alone.

In conclusion, the tested case scenarios affirm that integrated passive strategies grounded in wind and solar data can dramatically enhance comfort performance in tropical low-rise housing. In the final section, we reflect on how these findings can inform policy, scale-up implementation, and drive a new design paradigm for resilient urban living in Southeast Asia.

8. Prospects for Scalable Climate-Responsive Housing Solutions in Tropical Cities

The integration of wind-driven ventilation and solar control in low-rise residential buildings offers a promising pathway toward climate-adaptive, energy-efficient, and socially inclusive housing solutions in tropical cities. In rapidly urbanizing regions like Metro Manila—where heat stress, informal development, and energy poverty intersect—the application of passive environmental design is no longer an architectural ideal, but a public necessity. The results of this study affirm that localized, data-driven strategies can deliver significant gains in thermal comfort and reduce dependence on active cooling, even in constrained urban settings.

Scaling such solutions, however, requires a shift at multiple levels: design practice, policy frameworks, and construction ecosystems.

At the design level, the integration of environmental simulation tools—such as CFD, solar radiation mapping, and thermal comfort modeling—must become part of mainstream residential planning, not just in high-end or experimental architecture. Capacity-building programs targeting local architects, engineers, and technical schools can help mainstream climate-resilient thinking at the drawing board level. The increasing accessibility of open-source tools like Ladybug Tools, OpenFOAM, and DesignBuilder makes this not only possible but practical.

From a regulatory perspective, building codes and housing policy must evolve to include performance-based metrics rather than prescriptive checklists. Current social housing guidelines in the Philippines, while cost-conscious, often overlook thermal quality, ventilation efficiency, or microclimate response. Incorporating passive design standards, inspired by frameworks such as ASEAN SHINE, EDGE, or even vernacular best practices, could provide a scalable blueprint for both public and private developers.

Importantly, the replication of these strategies must be context-sensitive. What works in Metro Manila may require adjustment in Cebu, Jakarta, or Ho Chi Minh City due to differences in wind patterns, urban density, and socio-economic dynamics. Thus, a "design-for-local-climate" model, supported by regional data and iterative prototyping, is essential to successful adaptation.

Equally crucial is the question of affordability. While many passive strategies are low-tech and cost-efficient in operation, initial investments in better materials, shading systems, or simulation services may raise construction costs slightly. To bridge this gap, green financing mechanisms, incentives for sustainable development, and public-private partnerships should be mobilized. Pilot programs can demonstrate return-on-investment in terms of reduced energy bills, improved health outcomes, and disaster resilience—thereby reframing passive design as not just ecologically wise, but economically smart.

Finally, the value of climate-responsive housing extends beyond comfort. It touches on climate justice, disaster risk reduction, and urban equity. In a region where extreme weather events, heatwaves, and energy shortages are expected to intensify under climate change, housing must be a frontline defense—not a vulnerability. Scalable passive strategies empower communities to adapt with dignity, autonomy, and resilience.

In conclusion, the strategies explored in this study illustrate that climate-conscious

architecture is not limited by budget or complexity—it is limited only by mindset. With the right tools, policies, and cultural shift, tropical cities like Manila can pioneer a new generation of housing: one that breathes with the wind, shields from the sun, and uplifts the everyday experience of living in the heat.

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Painting in Situ: Su Shi's Mural Practices and Its Impact on Song Paintings

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Abstract

Su Shi and his circle have long been credited as originators of the Chinese literati painting tradition and with the inception of distinct literati art practices, including painting on silk, paper, and walls. Literati mural painting, due to its fragility, exists only in Song accounts, colophons, and poems. Building on the pioneering research of Maggie Bickford, Susan Bush, and others, this paper synthesizes their interpretations, elucidates the distinctness of literati mural practices, and sheds new light on cross-medium connections in literati paintings. The paper opens by focusing on the concept, "transmediality," to study the parallel developments between two art practices in different mediums and the appropriation of medium-specificity, which is built on Richard Barnhart's, Martin Powers', and Richard Vinograd's various reflections on "citation" within Chinese art. Then the paper argues that the beginning of literati paintings in Su Shi's time grew out of the mutual influence between mural paintings and other art mediums. It thus extends James Cahill's analysis of "spontaneity" in Song mural paintings to a broader picture of Song literati painting. The paper also complicates Susan Bush's and other scholars' reflections on the social attributes of Song literati art and suggests that literati mural paintings became surrogates for other mediums in different social settings.

Keywords: Su Shi, mural paintings, literati paintings

1. Introduction

Su Shi and his circle have long been credited as the originators of the Chinese literati painting tradition and with the inception of distinct literati art practices, including painting on silk, paper, and walls. Previous scholars on Su Shi concentrated on literati painting theories and their innovations, delving into the philosophical and social dimensions of their visual forms and how his circle forged a new pictorial tradition. Other non-literati Song mural painting scholars focused on its ties to preceding dynasties, tracking their stylistic legacies and art-historical references. My paper wants to synthesize those two groups of scholars by focusing on literati paintings' connections with murals and suggesting that literati paintings in Su Shi's time grew out of the mutual influence between mural paintings and other art mediums. Building on Richard Barnhart's, Martin Powers', and Richard Vinograd's various reflections on "citation" within Chinese art, I also introduce a concept called "transmediality" to study the cross-medium citations within literati painting and Chinese art. This new rhetoric serves as the conceptual framework for this essay,

emphasizing the fluidity of visual forms in premodern China rather than an independent stylistic revolution in one art genre.

2. "Transmediality": An Entry Point

Chinese art history often involves the larger issue of "transmediality," which refers to cross-medium references or appropriations. If an artwork embodies "transmediality" of another artwork of a different medium, it means that the artwork appropriates the medium-specificity or has explicit references to another artwork. The cross-medium references have several examples in East Asian art and have a variety of manifestations considering medium-specificity, subjects, literacy references, and functionality adoptions. In Japan, Ukiyo-e utilizes wooden carving to mimic the ink brushwork and adopts the colophons of previous ink paintings. In Korea, Munbangdo has references to paintings of flowers and fruits and presumably uses the format of album leaves. In premodern China, this borrowing and adoption of other art mediums prevailed, involving ceramics, mural paintings, scroll paintings, stone carvings, and so on. Most explicitly, the Chinese ceramics had images of Chinese paintings of various subject matters. The Epigraphic School of Chinese Calligraphy in the Ming and Qing dynasties shifted their attention from mimicking calligraphy on paper or silk to calligraphy on stone or metal. The print industry from the Song Dynasty onward developed its tastes based on previous art forms, deliberately adopting similar subject matters and visual languages. It is worth noting that the art forms deemed as "high art" (e.g., literati paintings) sometimes disguised their references to "low art" (e.g., mural paintings by craftsmen), which I will prove in the following sections of my essay by giving a close look at Su Shi and his circle. In contrast, those works of "low art" (e.g., ceramics in the Qing dynasty) made explicit or even extravagant references to the established masters of ink paintings (e.g., The Four Wongs in the Qing dynasty).

"Transmediality" is built on previous scholarship on "citations" in Chinese art, including that of Richard Barnhart, Martin Powers, and Richard Vinograd. While Richard Barnhart's generation of scholars sporadically exploited the potential of "citation" theories (a rhetorical expression of references in art), the "Art Historical Art of Song China" and "Art Historical Citation in Song Painting" workshop

and symposium on April 6-8, 2017 at the University of Michigan represent a new surge in academic interest in this topic and a cohesive scholars' pursuit in formalizing the potential of this conceptual framework.

One major branch of the theories is "art-historical citations" in Chinese paintings, exploring how premodern painters adopted the visual languages of precedents in art history. Martin Powers dated the inception of this theory to an article by Richard Barnhart in 1976, making clear that although Barnhart analyzed art-historical use in Li Gonglin's art, he did not name it "art-historical citation" or theorize it comprehensively. [1] Following this pioneering analysis, Martin Powers did a case study on Song paintings, formalized the theories, and complicated them by suggesting "art-historical citations" as a more skillful use of imitation.[2] Richard Vinograd contextualized this theory in a different way and focused on the participation of audiences when literati utilized art-historical citations and set barriers to art appreciation.[3]

Another branch of "citation" theories is "literacy citations" in Chinese art, which investigates how literary references took on a visual appearance in paintings. Martin Powers makes the "literacy citations" theory explicit in his articles about Li Gonglin and poet Tao Yuanming and claims that "literary theories of citation first flourished in Song times."[4] Alfreda Murck narrowed down these theories and pointed out three literary metaphors: "trees, a gurgling stream, and the configuration of eight rocks." [5] Richard Vinograd found concrete evidence of the use of poetic topics in Song's court paintings and the

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[1] Martin Powers, (2014, August 14). The Temporal Logic of Citation in Chinese Painting. *Art History*, *37*(4), 744-63, https://doi.org/10.1111/1467-8365.12113, 748; Richard Barnhart, (1976). Li Kung-Lin's Use of Past Styles. *Artists and Traditions: Uses of the Past in Chinese Culture*, ed. Christian Murck. Princeton: Princeton University Press.

[2] Martin Powers, (2019, September 24). The Art-Historical Art of Song China: Citation and Historicism in Tao Yuanming Returning to Seclusion. *Ars Orientalis*, *49*(20191029), https://doi.org/10.3998/ars.13441566.0049.003, 26.

[3] Richard Vinograd, (1988, March 1). Situation and Response in Traditional Chinese Scholar Painting. *The Journal of Aesthetics and Art Criticism*, *46*(3), 365-74, https://doi.org/10.1111/1540_6245.jaac46.3.0365, 369.

[4] Powers, "The Art-Historical Art of Song China," 22.

[5] Alfreda Murck, (2019, September 24). Su Shi and Zhao Lingrang: Brush Ideas of Wang Wei. *Ars Orientalis, 49*(20191029), https://doi.org/10.3998/ars.13441566.0049.002, 3.

Painting Academy examination.[1]

Following the theories of preceding scholars, "transmediality" proposes another possibility besides "literacy citations" and "art-historical citations" and introduces the potential of "cross-medium citations" within Chinese art. Those three concepts indeed could overlap in certain circumstances: "cross-medium citations" could be "literacy citations" when a painting refers to a poem or calligraphy piece; it also could be "art-historical citations" when a scroll painting mimics mural paintings. Departing from this broad conceptual framework, my endeavor in this essay is detailed and focuses on a case study—making clear the cross-medium references in literati paintings in Su Shi's time.

Previous mural paintings: Tang and Song

In this section, I will give a brief survey of mural practices preceding Wen Tong and Su Shi, characterize them, and point out two decisive figures — Sun Wei and Sun Zhiwei. They internalized previous practices, played with murals' medium-specificity, and formalized their own artistic style, which paved the way for the inception of literati paintings.

In the Tang Dynasty, many famous painters engaged in mural practices, which were mentioned in Tang accounts. According to Zhang Yanyuan's *Lidai Minghua Ji*, Chang'an's Cien Temple has mural paintings by Wu Daozi, Wang Wei, Weichi Yiseng, and many other established painters. [2] The subject matter of mural paintings in temple settings not only includes religious figures (e.g., Bodhisattva, monks, heavenly figures, and Buddha) but also non-religious subjects (e.g., mountain, water, peony, bamboo, peacock, slim horses). [3] According to Zhang's book, craftsmen were usually involved in applying colors to mural paintings, [4] alluding to labor divisions and collective works in mural practices. Zhang's accounts present us with the general picture of Tang mural paintings, in which famous painters (e.g., Wu Daozi and Wang Wei) and craftsmen

are both involved in mural practices, and temple mural paintings flourished during that time.

Because Su Shi and Wen Tong were all born in Sichuan, I will introduce two important Sichuan-based muralists — Sun Wei and Sun Zhiwei — in order to characterize Sichuan mural practices.

Sun Wei was a late-Tang painter who was not originally from Sichuan, according to Huang Xiufu's *Yizhou Minghua Lu* in the Song Dynasty.[5] In the first year of Guangming, the army of Huang Chao initiated a rebellion against the central government and broke through Chang'an, forcing the Tang emperor Xizong to flee to Sichuan. This turbulent political atmosphere evoked a feeling of uncertainty based on their own political stances and unpredictable violence conducted by the army of Huang Chao, which gave rise to population dynamics. According to Huang, Sun Wei was one of the painters who followed this migration, moving to Sichuan and leaving many mural paintings there.[6]

One distinct characteristic of Sun Wei's murals is his innovation in depicting water not as peaceful but as wild and turbulent. Su Shi did see Sun Wei's mural paintings and ascribed his accomplishments to his innovation in depicting water.

> 古今画水，多作平远细皴 […] 唐广明中，处士孙位始出新意，画奔湍巨浪 […] [7]

> Water has always been portrayed as expansive and peaceful […] In the Guanming year of the Tang dynasty, a recluse named Sun Wei started to innovate, depicting waters with huge waves […]

Sun Wei's second distinguishing feature is his depiction of ink on bamboo. Zhaojue Temple was located in Sichuan, where Sun Wei left ink on bamboo:

> 孙位者[…]昭觉寺休梦长老请画浮沤先生松石墨竹一堵。[8]

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[1] Richard Vinograd, (2019, September 24). Past, Present, and Future in the Imaginary of Song Painting. *Ars Orientalis 49*(20191029), https://doi.org/10.3998/ars.13441566.0049.005, 72.

[2] Zhang Yanyuan, (2009). *Complete Translation of the Records of Famous Paintings through the Ages* 历代名画记全译. Guizhou: Guizhou People's Publishing House 贵州: 贵州人民出版社, 171.

[3] Ibid., 171, 185, 196, 203.

[4] Ibid., 181.

[5] Huang Xiufu, (2009). *The Record of Famous Paintings of Yizhou in Three Volumes* 益州名画录 3 卷. Beijing Erudition Digital Technology Research Center 北京爱如生数字化技术研究中心, 1.

[6] Ibid.

[7] Su Shi, (2009). *The Collected Works of Su Dongpo (Later 10 Volumes)* 东坡集 40 卷后集 10 卷. Beijing Erudition Digital Technology Research Center 北京爱如生数字化技术研究中心, 1073.

[8] Huang Xiufu, *The Record of Famous Paintings of Yizhou* 益州名画录, 1.

Sun Wei [⋯] was invited by Monk Xiumeng to paint Mr. Fu Ou, pines, stones, and ink bamboo on a wall.

This account signifies that Sichuan's mural practices had already touched on the subject matter of ink bamboo, predating Wen Tong's ink bamboo practices on silk.

According to *Xuanhe Huapu* of the Song Dynasty, Sun Zhiwei was born in Meiyang, Sichuan, and excelled at religious paintings, which were commonly seen in Sichuan temples.[1] As *Huapu* reveals, Sun Zhiwei's paintings were famous and precious among Sichuan audiences: "Sichuan people treasure [Sun Zhiwei's paintings] more. If they gain his paintings, they will wrap and preserve them in a meticulous way."[2]

One of the major characteristics of Sun Zhiwei's practices is his depiction of water. Su Shi saw his paintings as a continuation of Sun Wei's practices:

> 处士孙位始出新意, 画奔湍巨浪[…]其后蜀人黄筌、孙知微皆得其笔法。[3]

> A recluse, Sun Wei, started to innovate, depicting waters with huge waves[…] After that, Huang Quan and Sun Zhiwei from Sichuan all learned his brushwork.

The second distinguishing feature of Sun Zhiwei's mural art is its meticulous preparation. Su Shi claims that he sometimes works on a mural painting for years before beginning it:

> 始知微欲于大慈寺寿宁院壁作湖滩水石四堵，营度经岁，终不肯下笔。一日，苍皇入寺，索笔墨甚急，奋袂如风，须臾而成，作输泻跳蹙之势，汹汹欲崩屋也。[4]

> At the beginning, Sun Zhiwei wanted to paint lakeshore, water, and stones on the four walls of Daci Temple's Shouning Court. Despite this, he spent years preparing it and never started painting. One day, he rushed into the temple, asked for brushes and ink immediately, waved his sleeves like winds, and finished painting in a quick manner. [The paintings] depict [water] as turbulent and wild, as if to destroy a house.

Su Shi's accounts above also betray the third characteristic of Sun Weizhi's murals — quickness and spontaneity. According to James Cahill, Tang Chinese painting could be done in both a quick and slow manner, and Wu Daozi was one representative of the quickness, particularly mural practices — finishing about 300 meters of mural paintings on the palace's walls in one day.[5] He then claims that while Tang art criticism favors both, later art criticism favors quickness and spontaneity over slowness.[6] Indeed, Sun Zhiwei's mural practice follows the same trend as Wu Daozi, done in a quick and natural way. He finished painting quickly by waving his sleeves "like winds," attesting to his practice's fast speed. Correspondingly, this quickness negates hesitations and deliberate manipulations, leading to spontaneity and naturalness. The subject matter here was also noticeable: water and stone, which I will analyze in the following section.

3. Learning from Murals: Su Shi and His Circle

After summarizing the mural practices preceding Su Shi, I will elucidate in this section how those mural practices were theorized, internalized, and incorporated into art practices by Su Shi and his literati circle. During this process, cross-medium references became explicit, complicating literati paintings and their inception.

Su Shi's first obvious sign of mural influences is that he painted in the muralist's style. According to Mi Fu's *Huashi*:

> 吾自湖南从事过黄州，初见公，酒酣，曰："君贴此纸壁上，观音纸也。" 即起作两枝竹一枯树一怪石见与。[7]

> I [Mi Fu] left Hunan and passed through Huangzhou for work; it was the first time I saw him [Su Shi], who was drunk. He said, "You pasted this Guanyin paper on the wall." Then, [he] stood up and depicted two bamboos, one withered tree, and one strange stone.

By painting paper on the wall, Su Shi explicitly made paper paintings in a muralist's manner. The medium-specificity lies in its unique way of

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[1] Wang Qunli. (2012). *The Xuanhe Catalogue of Paintings* 宣和画谱. Zhejiang: Zhejiang People's Fine Arts Publishing House 浙江: 浙江人民美术出版社, 85.

[2] Ibid.

[3] Su Shi, *The Collected Works of Su Dongpo (Later 10 Volumes)* 东坡集40 卷后集10 卷, 1073.

[4] Ibid, 1073-4.

[5] Gao Juhan, (2011). *Style and Concept* 风格与观念. China Academy of Art Press 中国美术学院出版社, 66.

[6] Ibid.

[7] Mi Fu, (2009). *History of Painting* 画史. Beijing Erudition Digital Technology Research Center 北京爱如生数字化技術研究中心, 9.

holding brushes—one's body then stood parallel with the painted materials and held brushes vertically to his body, all of which were the exact opposite of painting on desks or the ground. The same brushstroke done on the horizontal surface entails different body movements compared with the vertical one, which requires varied training and a transformation of artistic practices. This way of holding brushes was also labor-intensive and demanded more forces to keep the brush stable. On the other hand, by distancing one's wrist from the supporting device, the brush could move in a freer way and in a broader space. Therefore, by pasting paper on the wall, Su Shi appropriated the medium-specificity of murals and deployed the techniques of muralists, making his painting a "transmediality" of murals.

Su Shi's theory on water depiction is the second muralists' influence. Su Shi summarizes Sun Wei and Sun Zhiwei's water depiction as "活水" (literally "living water," meaning flowing water) in his essay:

> 唐广明中，处士孙位始出新意，画奔湍巨浪[…]其后蜀人黄筌、孙知微皆得其笔法[…]近岁成都人蒲永升，嗜酒放浪，性与画会，始作活水，得二孙本意。[1]
>
> During the Tang dynasty's Guanming year, a recluse named Sun Wei began to innovate, depicting waters with massive waves […] After that, Huang Quan and Sun Zhiwei from Sichuan all learned his brushwork […] Recently, Pu Yongsheng from Chengdu, drinking wine and being uninhibited, started to depict flowing water once his inner self resonated with painting, which had the original techniques of the two Suns [Sun Wei and Sun Zhiwei].

In this paragraph, Su Shi brackets Sun Wei, Sun Zhiwei, and Pu Yongsheng as a new school of painting water and describes and theorizes it as a depiction of "flowing water" (活水). The first character here literally means "living," which forms a sharp contrast with his later comments on another school of painting water — "死水" (literally "dead water," meaning peaceful water):

> 古今画水，多作平远细皴，其善者不过能为波头起伏，使人至以手扪之，谓有洼隆，以为至妙矣。然其品格，特与印板水纸争工拙于毫厘

间耳[…]如往时董羽、近日常州戚氏画水，世或传宝之。如董、戚之流，可谓死水，未可与永升同年而语也。[2]

People usually depict water as expansive and peaceful, or at best as slightly undulating waves that invite touching. They thought such water was undulating and the best depiction. Despite this, there is only a minor difference between it and printed water paper […] Dong Yu in the past and recently Mr. Qi from Changzhou painted water, which ordinary people treasured. However, the water, like Dong's and Qi's, was dead water, which could not be compared with Yongsheng's.

Su Shi creates a Sishui/Huoshui (死水/活水) dualism in this passage and praises the depiction of flowing water. His sentence, "at best as slightly undulating waves," betrays his personal taste in water painting: the more undulating the better. Su Shi's concept of water was the polar opposite of Mi Fu's and Mi School's concepts of mountain and water, which merits further study by scholars. However, most notably, the theory Su Shi summarized from Sun's mural practices had an impact on himself and his circle, as embodied in Huang Tingjing's poem:

> 题东坡水石
>
> 东坡墨戏，水活石润。[3]
>
> Colophon on Su Shi's Water and Stone
>
> Su Shi experimented with ink, resulting in flowing water and wet stone.

To begin, Su Shi used the same subject matter as Sun Zhiwei's Daci Temple mural painting—water and stone. And also, Huang's rhetoric of "water living" (水活) was the exact reference to Su Shi's Sishui/Huoshui (死水/活水) dualism, demonstrating that not only did Su Shi practice depicting flowing waters inspired by murals, but his "flowing water" theory also influenced his circle.

The third impact from muralists is about the understanding of Wen Tong's theory on spontaneity. Su Shi and Wen Tong were famous for their new theory on the spontaneity of painting, which was recounted in Su Shi's essay

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[1] Su Shi, *The Collected Works of Su Dongpo (Later 10 Volumes)* 东坡集40 卷后集10 卷, 1073-4.

[2] Ibid, 1073-4.

[3] Huang Tingjian, (2009). *The Supplementary Collection of Shangu 山谷别集: 20 卷*. Beijing Erudition Digital Technology Research Center 北京爱如生數字化技術研究中心, 406.

on his cousin Wen Tong's bamboo paintings:

故画竹必先得成竹于胸中，执笔熟视，乃见其所欲画者，急起从之，振笔直遂，以追其所见，如兔起鹘落，少纵则逝矣。与可之教予如此。[1]

Therefore, painting bamboo entails "the complete bamboo in the breast": holding brushes and closely looking at [blank paper] until the subject matter is visualized, [one should] take quick actions and depict it in a swift manner to copy [the mental image], as if the actions of moving rabbits and birds, [because] a short relaxation dissipates [the mental imagery]. This is Wen Tong's teaching to me.

Su Shi did absorb Wen Tong's teaching of spontaneity in his own practices, as related by Li Zhiyi:

次韵东坡所画郭功甫家壁竹木怪石诗

[…] 一杯未醽笔已濡，此理分明来面壁。我尝傍观不见画，只见佛祖遭呵骂。 […] 汗流几案惨无光，忽然到眼如锋铓。急将两耳掩双手，河海振动雷电吼。[2]

Poem with the same rhythm: Su Shi's painting of bamboo, wood, and strange stones on Guo Gongfu's wall

[…] A cup of alcohol remained unfinished while brushes were dipped in ink, which would "meditate" in front of the wall. I [Li Zhiyi] witnessed [the painting process] but could not see the painting itself, only [hearing the loud sounds] as if the Buddha had been cursed. […] [Su Shi's] sweat dripped on a desk, darkening its glaze, and his sudden movements were sharp like knives. I thus covered my ears with my hands immediately, [because he was] roaring like a turbulent sea and lightning.

Following Wen Tong's teaching on quickness and naturalness, Su Shi painted swiftly and sweated on the desk. Well immersed in the painting and aided by alcohol, he was uninhibited in every aspect and allowed himself to make loud sounds freely and to follow the movement of his art-making. The spontaneity was thus both visible in his paintings and also in his voice, creating a twofold rhythm intertwined

in the visual appearance.

Normally, Wen Tong is credited as the sole originator of spontaneity (*Xiongyou Chengzhu*, 胸有成竹) theories and the first to apply the prepared-and-done-quickly painting approach. However, as James Cahill points out above, Wu Daozi used this approach in his mural practices during the Tang dynasty. Also, as I mentioned, Sun Zhiwei also applied this approach, and his painting was seen by Wen Tong and commented on in a poem.[3] All of those suggest that Wen Tong was not the initiator of spontaneous painting practices, and mural practices predate them.

Literati mural practices: surrogates for social attributes

In previous sections, I have argued that literati paintings are the "transmediality" of mural practices, elucidating how mural practices shifted literati art and how their arts embodied cross-medium citations. However, Su Shi and his circle also dedicated themselves to mural practices, producing literati mural paintings. In this section, I argue that literati mural paintings are "transmediality" of poetry and calligraphy, appropriate their medium-specificities, and become surrogates for them in different social settings.

Previous scholars have already noticed the social attributes of Chinese paintings. Susan Bush suggests in her book dedicated to literati paintings that a Chinese painting was sometimes done at a social gathering as a way to express one's own personality while also showing one's historical circumstances.[4] Susan's analysis reveals a significant difference between these Chinese paintings and those created in the workshop: the paintings completed during social gatherings had their own social functions and corresponding social interactions. Art in such circumstances was meant to be interactive in varied respects, unlike some Tang mural paintings based on drafts and preexisting patterns. As I previously mentioned in Li Zhiyi's poem, Su Shi's art-making was surrounded by onlookers who were thrilled and immersed in

[1] Su Shi, *The Collected Works of Su Dongpo (Later 10 Volumes)* 东坡集 40 卷后集 10 卷, 1433.

[2] Li Zhiyi, (2009). *The Collected Works of the Recluse of Guxi* 姑溪居士集. Beijing Erudition Digital Technology Research Center 北京愛如生數字化技術研究中心, 758-9.

[3] See 孙知微画(文同作) in Zhuang Siheng 庄思恒, (2009). The Revised Gazetteer of Guan County (Guangxu Edition) *(光绪) 增修灌县志*. Beijing Erudition Digital Technology Research Center 北京愛如生數字化技術研究中心, 1227.

[4] Susan Bush, (2012). *The Chinese Literati on Painting: Su Shih (1037-1101) to Tung Ch'i-Ch'ang (1555-1636)*. Hong Kong: Hong Kong University Press; London, 11.

the event. Thus, art became an unfolding performance with the rhythm of dipping ink and audience reactions, bringing playfulness to the gathering, usually with the aid of alcohol. Different from the previous mural paintings featured by collaborative works, literati paintings were often finished by the painter himself and could be seen as his original works. In a social setting, as Susan Bush claims above, such paintings that solely contributed to the painter himself could be treated as manifestations of one's own personality and individualism. Maggie Bickford complicated the understanding of the expression of personality by tracing its origins, stating that while poetry and calligraphy were considered means of expression and communication between like-minded people, the art of ink bamboo was introduced as a new way of communicating during the Song dynasty. [1] Maggie Bickford indicts a secret language embedded in literati paintings created in a social setting where close friends shared tacit knowledge, such as painters' secret stories, frequently used literary metaphors, political opinions, and favorite historical figures. In a sense, a few simple brushstrokes of ink imagery could be a puzzle involving literary citations, historical references, religious knowledge, and private communications. According to Richard Vinograd, while the complexity of references used in Chinese paintings suggests art historical erudition or stylistic accuracy, the true emphasis is on the audiences' ability to participate and recognize the references. [2] Vinograd not only drew attention to the display of art historical knowledge in art-historically referential paintings, but he also inspired a rethinking of the coding-and-decoding process in like-minded audiences among the literati. As a result, a painting created in a group has an inherent playfulness embedded in its form of puzzle, which invites any target audience to forge a response, such as colophons, poems, and paintings.

Adding on to the playfulness entailed by the social attributes of gathering paintings, the literati's mural practices' distinctness lies in their functionality as a gift. As Li Zhiyi's previous

poem reveals, Su Shi has already painted murals in public and at gatherings. However, Su Shi's own account betrays more information:

> 郭祥正家醉画竹石壁上郭作诗为谢且遗古铜剑二
>
> [⋯]平生好诗仍好画，书墙浣壁长遭骂。
>
> 不嗔不骂喜有馀，世间谁复如君者。[⋯][3]

> [I, Su Shi,] drunkenly painted bamboos and stones on Guo Xiangzheng's home's wall; Guo gave back a poem and left two archaic bronze swords.
>
> […] [I, Su Shi,] always loved poems and paintings, leaving them on walls, [but I was] always sworn at.
>
> [You, Guo Xiangzheng,] instead of being angry or cursing at me, were delighted; there could not be another person like you. […]

In this poem, Su Shi was invited to his friend Guo Xiangzheng's house, where they drank alcohol and had a delightful gathering. As it reveals, graffiti was frequently unwelcome in private households because the walls were well preserved. Su Shi claimed to be uninhibited and was unable to restrain his expressive impulses, leaving graffiti (calligraphy or paintings) on other people's walls. However, Guo Xiangzheng treated them not as graffiti but as serious artworks and reciprocated with gifts. As the last line reveals, Su Shi was not just happy about the gifts, but also about Guo giving himself the self-esteem Su needs. This mutual respect laid the groundwork for true friendship, as well as a shelter from the vicissitude of political climates. Normally, literati would leave a poem or a piece of calligraphy on walls or other mediums as a gift and proof of friendship for a friend, but Su Shi innovated this idea by elevating mural paintings to the same status as poetry and calligraphy, galvanizing literati to use mural paintings as surrogates in gathering settings.

Besides gatherings, Su Shi also promoted literati mural paintings when visiting friends. Beginning with the Tang Dynasty, poems and calligraphy were frequently left on a friend's wall, as well as Japanese banana leaves and persimmon leaves. [4] This tradition had a twofold significance: to give a poetic gift and to make a

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[1] Maggie Bickford, (1996). *Ink Plum: The Making of a Chinese Scholar-Painting Genre*. Cambridge: Cambridge University Press, 105.

[2] Vinograd, "Situation and Response in Traditional Chinese Scholar Painting," 7.

[3] Su Shi, *The Collected Works of Su Dongpo (Later 10 Volumes)* 东坡集40 卷后集10 卷, 666-7.

[4] See Dou Gong's "Seeking the Hidden Daoist but Failing to Meet Him" 窦巩《寻道者所隐不遇》.

notice. However, Su Shi created a new innovation:

> 东坡书壁
>
> 前辈访人不遇，皆不书壁。东坡作行记，不肯书牌，其特地，止书壁耳。候人未至，则扫墨竹。[1]
>
> Su Shi writes on the walls
>
> People before [Su Shi] did not write on walls when visiting someone who happened to be away from home. Su Shi made a notice, not on the wooden blocks [hanging on the wall], but on the walls themselves. If Su Shi was still waiting, he did ink bamboo.

Normally, when visiting one's home in a remote place in premodern times, the visitor could not estimate the waiting time. Therefore, the visitor could choose to stay or simply leave; in the latter case, giving notice became extremely important. As the account reveals, people before Su Shi prioritized the literary message and intended to make a notice. Su Shi did follow this tradition when he intended to leave, while altering the pictorial-literary hierarchy if he was still waiting. Leaving ink bamboo not only symbolizes his favor of this subject but also demonstrates his capability of making mural paintings. He was deviant from two art traditions: bringing mural painting out of domestic settings and elevating paintings to the realm of "high arts". His literati mural painting left on friends' walls was thus a gift, a surprise, and a secret language.

Wu Hung brings up the often-cited concept of "textual enclosure" in his book about Chinese screen, which he defines as a textual circle constituted by historical records, colophons, and modern writings, yielding and blocking off "an entrance to painting itself." [2] Following this pioneering thinking of an inner enclosure, my close look at the social attributes of literati paintings leans toward an outer circle—the "social enclosure." Unlike workshop artists, who disengaged themselves from social events during art-making and commissioning, literati painters were engaged in social settings of different kinds (done in gatherings, gifted to friends afterward, or left with a colophon by friends). This intriguing social enclosure contrasts with the desolation and loneliness evoked by literati imagery (e.g., strange stones and withered trees), presenting a multifaceted artist persona.

4. Conclusion

My research on mural paintings owes a great deal to previous scholarship, which frequently provided me with a new perspective on Chinese paintings and introduced distant literary figures in the history to me. The recent academic trend of reflections on materiality and medium-specificity were the initial inspirations for me to embark on this new research on identifying the distinctness of literati mural practices and their cross-medium references. On the other side, my essay also wants to provide a case study outside of the stylistic revolution discourse, addressing the complexity of subject-style relations in Chinese art.

As I stated above, this new research still has more puzzles to resolve, and about Mi Fu's water theory in particular. The personalization of ink bamboo in letter communication was dismissed by me considering the essay's space and could be further expanded into a paper. In a similar vein, I also deleted the parts about how Wen Tong painted bamboos like dragons as embodied in his poem and Huang Tingjian's poem and how the account around Su Shi also betrays three ways of extracting images from walls during the Song dynasty, which complicate the cross-medium citations and need further investigation.

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[2] Wu Hung, (1996). *The Double Screen*. University of Chicago Press, 30.

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A Study on the Spatial Support Mechanisms of Transitional Space Layout for Neighborhood Social Interaction in Low-Rise Row Housing in Cebu City, Philippines

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Abstract

This paper investigates the role of transitional space layouts in shaping neighborhood-level social interaction within low-rise row housing developments in Cebu City, Philippines. Drawing on field-based observations, design analysis, and cultural insights, the study explores how spatial elements such as front yards, alleys, and shared courtyards function as social condensers in urban environments marked by high density and socio-cultural diversity. Findings highlight that the presence, configuration, and adaptability of transitional spaces are critical to fostering spontaneous encounters, collective identity, and informal governance mechanisms. The research demonstrates that cultural norms—particularly Filipino concepts such as *bayanihan* and *pakikisama*—are spatially enacted through semi-public zones that residents often appropriate and personalize. However, current housing policies and design practices frequently marginalize these spaces in favor of standardized layouts and densification goals. Through comparative analysis and policy critique, the study calls for a reframing of transitional zones as essential social infrastructure in the planning and evaluation of housing. It concludes by offering design and policy recommendations that promote culturally responsive and socially sustainable urban living environments.

Keywords: transitional space, Cebu City, informal urbanism

1. Introduction

Urban form plays a central role in shaping social relationships, particularly in the dense fabric of developing cities where space is limited and communities are diverse. One often-overlooked but profoundly influential element in urban design is the transitional space—zones that mediate between the private realm of the home and the public realm of streets and communal facilities. These in-between spaces include front yards, porches, stoops, narrow alleys, and shared courtyards, which serve not only as circulation paths but as vital social interfaces that foster spontaneous interaction, observation, cooperation, and collective identity formation.

In the context of low-rise row housing, where built density and compact footprints dominate, transitional spaces are especially important.

These spaces offer residents the opportunity to extend their domestic life outdoors, engaging neighbors and contributing to a sense of informal surveillance, belonging, and mutual care. Unlike high-rise developments that often suffer from anonymity and social isolation, low-rise communities have the latent spatial potential to foster strong interpersonal connections—provided that their design effectively incorporates social-supportive transitional zones.

This issue becomes particularly salient in Cebu City, Philippines, a secondary but rapidly urbanizing city where waves of internal migration, economic shifts, and disaster resettlement programs have driven the need for scalable, yet socially sensitive housing models. Many of these housing developments have emerged through public-private-NGO collaborations, such as those led by Gawad Kalinga (GK) and Habitat for Humanity Philippines (HfHP), both of which emphasize community involvement and participatory design in their principles (Mörnhed & Gehander, 2008). Yet, even within such people-centered frameworks, the actual spatial arrangements of transitional spaces often reflect a tension between standardization and cultural adaptability.

Cebu City's topography and socio-economic diversity add layers of complexity. The interaction between built form and social behavior varies significantly across different barangays (neighborhoods), where informal appropriation of space—through plantings, benches, laundry lines, or children's play areas—reveals the community's deep desire for spatial autonomy and social proximity. In recent assessments of post-disaster resettlement in both Tacloban and Cebu, it has been shown that design strategies which ignore the nuanced roles of transitional spaces risk undermining long-term community cohesion (Salang, 2020).

This essay critically examines how the layout and design of transitional spaces in Cebu's low-rise row housing projects either support or inhibit neighborhood social interaction. Drawing upon field-based case studies, urban design theory, and evaluation reports on resettlement housing, the discussion will unpack the mechanisms—spatial, behavioral, and cultural—that shape daily communal life. In doing so, it aims to contribute to a more nuanced understanding of urban social sustainability in Southeast Asian housing environments.

2. The Context of Low-Rise Row Housing in Cebu City

Cebu City, located in the Central Visayas region of the Philippines, has emerged as a key urban hub outside of Metro Manila, characterized by a booming BPO sector, increased internal migration, and fast-paced commercial expansion. As a result, the city has experienced rapid demographic shifts and intensified demand for accessible and affordable housing. This demand has been further exacerbated by environmental vulnerabilities, such as typhoons and flooding, which have displaced thousands of families over the past two decades. The pressure to house a growing and often socioeconomically marginalized population has led to the proliferation of low-rise row housing developments as a strategic urban intervention.

These low-rise row housing typologies—typically one- to two-story attached units organized in linear blocks—have been a popular choice due to their cost-effectiveness, relatively high land-use efficiency, and perceived capacity to support communal living. Major contributions to this housing form have come from collaborative initiatives involving local governments, international donors, and nonprofit actors, most notably Gawad Kalinga (GK) and Habitat for Humanity Philippines (HfHP). Both organizations emphasize "building not just houses, but communities", promoting values of solidarity, participatory construction, and local empowerment. The GK approach in particular often integrates "bayanihan" principles, whereby residents co-build and co-manage housing areas in a collective spirit (Mörnhed & Gehander, 2008).

Yet despite their social intentions, many of these developments face spatial challenges. The layout of these housing clusters tends to be standardized and top-down in design, often failing to adequately respond to the nuanced behaviors, cultural practices, and daily interaction patterns of Filipino residents. While the internal unit design may be sufficient for shelter, the spaces between homes—alleyways, front yards, narrow streets, and buffer zones—are frequently underutilized or insufficiently planned, compromising opportunities for spontaneous neighborly encounters, communal gatherings, and localized

governance.

Recent studies suggest that the quality of transitional spaces—those semi-public and semi-private zones that exist between a dwelling and the wider neighborhood—plays a pivotal role in shaping social capital and collective resilience within these communities. For instance, in post-disaster resettlement sites across Cebu and Tacloban, the absence of shaded walkways, gathering nooks, or multifunctional front spaces led to a decline in both daily interactions and residents' identification with their new environment (Salang, 2020). Informal adaptations by residents—such as adding benches, extending roofs, or creating makeshift gardens—reveal the latent social needs that often go unmet in the original architectural blueprint.

Cebu's informal urbanism must be considered as a contextual force. Even within formal housing sites, residents frequently blur the lines between private and public realms, reflecting a cultural orientation toward communal use of space. Children playing in front alleys, neighbors sharing meals on verandas, and elders socializing on street corners are all typical scenes in Filipino neighborhoods, underscoring the interactive potential of low-rise configurations—if appropriately designed.

Cebu City presents a complex yet fertile ground for evaluating how transitional spatial design can either hinder or enhance community interaction. As low-rise row housing becomes a dominant urban form for middle- to low-income populations, there is a pressing need to refine its spatial logic to accommodate not just physical dwellings, but the social life that makes these spaces truly livable and resilient.

3. Spatial Mechanisms of Transitional Zones

In low-rise row housing developments, particularly within urban environments like Cebu City, transitional spaces—those situated between private dwellings and public streets—serve as more than mere physical buffers. These semi-public, semi-private areas, such as front porches, narrow alleys, shared courtyards, and small front yards, operate as vital arenas of social engagement. They provide residents with the opportunity to step beyond the confines of their homes and into a space that encourages casual encounters, spontaneous dialogue, and cooperative behavior. However, these spaces are frequently underdesigned or misclassified in official site plans, often treated merely as circulation routes or setback requirements rather than as the essential social condensers they can become.

Recent housing projects in Cebu City have revealed that the deliberate design of these transitional spaces—through the provision of seating, shading structures, vegetation, and clearly defined edges—can dramatically increase their social utility. As highlighted by Magno-Ballesteros et al. (2024), the integration of human-scale elements not only encourages longer and more frequent use of these areas but also enhances informal interactions that are critical to building community trust and resilience. The value of transitional spaces lies not just in their physical presence but in their ability to mediate relationships, making them central to the success of any communal housing strategy.

Cultural norms in the Philippines further elevate the importance of these spaces. Concepts such as *pakikisama* (smooth interpersonal relationships) and *bayanihan* (community spirit) are deeply embedded in Filipino society, and transitional spaces act as the stage upon which these values are enacted. Whether used for early morning coffee, children's games, impromptu neighborhood meetings, or weekend cooking sessions, these in-between zones form the fabric of everyday life. Their role in facilitating intergenerational interaction, mutual support, and visibility cannot be overstated. In this context, the spatial configuration of housing developments must align not only with functional needs but also with deeply rooted social behaviors.

Different spatial arrangements lend themselves to varying levels of interaction. In Cebu's row housing developments, the linear front yard model typically features a narrow space between the house façade and the street. Though often modest in size, these front yards can be powerful social tools when adapted by residents with benches, flower pots, or hanging laundry, serving as informal nodes for neighborly exchange. The courtyard cluster model, where houses are organized around a central shared open space, supports group gatherings, children's play, and shared maintenance activities, creating a strong sense of micro-community. Meanwhile, alley-focused layouts offer intimate, high-contact spaces that can evolve into vibrant social corridors if

boundaries remain porous and residents feel collective ownership.

Where design has prioritized density or vehicular circulation over social functionality, these spaces become sterile and underutilized. Excessive enclosure, hard paving, lack of greenery, or poorly scaled proportions strip transitional spaces of their sociability. Conversely, when residents are granted or take liberties to personalize and adapt these areas—extending rooflines, adding semi-permanent seating, or decorating with cultural symbols—the result is often an organically evolved public realm with a distinctly local character.

Transitional spaces in Cebu City's low-rise housing developments must be understood not as residual or leftover areas, but as intentional, flexible, and socially generative zones. These spaces function as the "social infrastructure" that sustains everyday life and collective well-being. Designing with this understanding can transform generic housing blocks into resilient, culturally embedded, and socially dynamic neighborhoods.

4. Community Interaction and Cultural Considerations

Community interaction within low-rise row housing environments is not only a matter of physical proximity—it is profoundly shaped by the socio-cultural values, practices, and spatial habits of its residents. In Cebu City, as in much of the Philippines, neighborhood life is governed as much by informal social codes as by formal urban design. Understanding these cultural considerations is essential for comprehending how transitional spaces function beyond their physical dimensions, acting as the stage upon which everyday social dramas unfold.

Central to Filipino social life are the intertwined concepts of *pakikipagkapwa* (shared personhood), *pakikisama* (smooth interpersonal relations), and *bayanihan* (communal unity or collective cooperation). These values are manifested not just in interpersonal behavior but in spatial practices—how people extend their homes, share resources, and claim semi-public spaces for personal or collective use. In low-rise row housing, the lines between private and public are fluid, negotiated daily through subtle cues, shared understandings, and informal conventions.

In Cebu's housing communities, transitional zones such as front yards, doorsteps, and alleys often become **semi-domestic extensions** of the home. Families prepare food outdoors, children use alleys as playgrounds, and neighbors hold evening conversations while seated on makeshift benches or low stools. These behaviors are not anomalies—they are expressions of a cultural disposition toward collective visibility and shared experience, shaped over generations in densely populated barangays and reinforced by socio-economic necessity.

This spatial-social dynamic is evident in several recent low-rise row housing developments in Cebu. The table below synthesizes field-based observations from selected housing projects to illustrate how different physical characteristics of transitional spaces correlate with social interaction and resident-driven modifications.

Table 1. Transitional Space Features and Community Behavior in Selected Cebu Housing Projects

Housing Project	Alley/Front Yard Width (m)	Presence of Defined Shared Space	Observed Social Interaction	Informal Modifications by Residents
GK Village A	1.5	Yes (central courtyard)	High – daily gatherings, shared childcare	Benches, potted gardens, shared cooking areas
HfHP Site B	1.2	No – linear unit row	Moderate – mostly doorstep greetings	Laundry lines, added shade with tarpaulins
NGO Project C	2.0	Yes (open-ended alley)	High – children play zones, informal shops	Sari-sari stores, extended eaves, community shrine
Resettlement	1.0	No – minimal space	Low – limited	Trash bins placed in

Site D		between units	neighbor interaction	alleys, makeshift fences

The table reinforces the qualitative insight that both spatial dimensions and cultural adaptability are key to fostering meaningful social interaction. When physical layouts provide flexibility and residents are allowed to personalize space, the result is a vibrant, interactive, and resilient community. Conversely, rigid layouts without communal nodes or adequate spatial buffers tend to inhibit the formation of social bonds, despite residents' willingness to engage.

Social surveillance and informal governance in these communities are facilitated by spatial openness. A grandmother sitting on her front step not only interacts with passersby but keeps watch over children, visitors, and events in the alley—enforcing norms without formal authority. These networks of informal accountability and shared oversight are especially vital in low-income or post-resettlement contexts, where institutional presence is weak and mutual trust becomes the glue that holds the community together.

Ritual and religion play a key role in how space is inhabited and valued. In many Cebuano neighborhoods, small shrines or altars are placed at thresholds, while seasonal festivals are celebrated in shared yards or alleys. These moments of collective participation further strengthen spatial memory and cultural continuity, embedding deeper layers of meaning into otherwise generic housing environments.

In sum, transitional spaces in Cebu City's low-rise row housing are not passive containers but active participants in community life. Their role in shaping interaction is inseparable from the cultural frameworks within which they are embedded. Designing with this cultural lens requires more than physical specifications—it demands attentiveness to how people live, adapt, and perform social belonging in space. Only through such an integrated approach can housing environments evolve into truly inclusive, resilient, and culturally grounded communities.

5. Challenges and Policy Implications

Despite the demonstrated importance of transitional spaces in promoting neighborhood interaction and socio-spatial resilience, multiple structural and institutional challenges persist in the design and governance of low-rise row housing in Cebu City. These challenges are not merely technical but are deeply embedded in the political economy of urban development, the bureaucratic cultures of planning agencies, and the often conflicting agendas of stakeholders involved in the production of housing for the urban poor.

One of the primary obstacles is the dominance of a quantity-over-quality mindset in housing delivery. Government programs—especially those focused on post-disaster resettlement or socialized housing—tend to measure success through the number of units produced, rather than the long-term social sustainability of the communities formed. This results in standardized layouts with minimal regard for site-specific cultural practices, microclimatic conditions, or the spatial needs of social interaction. As a consequence, transitional spaces are often underdimensioned, poorly located, or entirely absent, reducing them to lifeless corridors or residual strips between houses (Salang, 2020).

Compounding this issue is the fragmentation of policy frameworks governing urban housing and design. While national agencies such as the Housing and Land Use Regulatory Board (HLURB) set minimum technical standards, these do not adequately account for social design parameters, such as the inclusion of communal gathering spaces or spatial flexibility for resident-led modifications. At the local level, comprehensive land use plans (CLUPs) and zoning ordinances often prioritize land efficiency and infrastructure over community cohesion. Without integrative guidelines that connect physical planning with social outcomes, even well-intentioned developments can fall short of fostering vibrant neighborhoods.

Another significant challenge is the limited participation of residents in the design process. Although NGOs like Gawad Kalinga promote participatory construction models, government-led and PPP (public-private partnership) projects often operate on top-down templates. Residents are frequently brought into the process after the critical spatial decisions have already been made. This lack of early

engagement not only alienates communities from their built environment but also undermines opportunities to embed vernacular knowledge and cultural nuances into spatial design. In Cebu City, where informal spatial practices—such as extending the home into the alleyway or transforming the front yard into a semi-public space—are central to daily life, ignoring such inputs leads to sterile and disconnected environments.

Equally problematic is the encroachment of neoliberal urbanization principles, which treat housing more as a commodity than a right or social good. As Sevilla (2023) points out, recent housing efforts in Cebu have been shaped by private-sector logics of return on investment, which favor compact, high-density models over culturally sensitive, interaction-friendly layouts (Sevilla, 2023). While this may increase the speed and scale of housing delivery, it often sidelines the need for transitional zones that facilitate long-term social sustainability.

In light of these challenges, there is an urgent need for a policy reorientation that recognizes the social and cultural dimensions of housing space. Transitional zones should be formally acknowledged as essential components of site planning, with design standards that mandate their inclusion, contextual adaptation, and flexibility for personalization. Urban policy must move beyond unit counts and cost-efficiency to include qualitative metrics such as social interaction indices, resident satisfaction, and long-term community health.

Inter-agency coordination must be strengthened to ensure that design and planning frameworks are not only technically sound but socially responsive. This means integrating housing policy with social welfare, health, and education policies to create a truly holistic approach to community building. Local governments, as the front-liners of urban management, should be empowered with technical capacity and participatory tools to engage residents meaningfully from the beginning of the design process.

Capacity-building for planners, architects, and engineers is essential. Professionals must be trained not just in spatial optimization and structural codes, but in socio-spatial dynamics, participatory design methods, and cultural sensitivity. Architectural education in the Philippines must evolve to include modules on informal urbanism, ethnographic methods, and human-centered design. Only then can we bridge the gap between spatial form and social function.

While the potential of transitional spaces in Cebu City's low-rise row housing is immense, it remains unrealized due to systemic policy gaps, design rigidities, and institutional inertia. By rethinking housing not merely as infrastructure but as a social ecosystem, and by foregrounding transitional spaces as critical links in that ecosystem, policy and planning can shift toward a more inclusive, resilient, and culturally rooted model of urban development.

6. Conclusion

Transitional spaces, though often overlooked in the design of low-rise row housing, play a foundational role in shaping the social ecology of neighborhoods. As this study has illustrated, these in-between zones are far more than architectural afterthoughts—they are the connective tissue that sustains everyday interactions, nurtures community cohesion, and embeds cultural practices into the built environment. In Cebu City, where the interplay between formal planning and informal spatial appropriation is especially pronounced, the careful articulation of transitional spaces can mean the difference between sterile housing blocks and thriving neighborhoods.

Throughout this essay, we have seen that when transitional spaces are designed with intentionality—through spatial permeability, physical accessibility, and cultural sensitivity—they become catalysts for mutual support, informal governance, and intergenerational engagement. The physical configurations of these spaces, from linear front yards and alley corridors to shared courtyard clusters, profoundly influence how residents see, meet, and relate to each other. More importantly, these spaces serve as stages for enacting core Filipino values such as *pakikisama* and *bayanihan*, allowing for the preservation of social customs even within modern, standardized housing layouts.

However, the widespread potential of these spaces is undermined by systemic design and policy shortcomings. Housing projects often prioritize density metrics and delivery speed over cultural integration and community formation. As shown in field observations and supported by research, developments that

ignore the social function of space tend to experience weaker neighbor ties, reduced collective care, and a lack of local identity. Conversely, those that afford room for personalization and social life—even within small footprints—tend to cultivate more vibrant, resilient, and secure environments.

The implications for urban policy, housing design, and planning education are profound. First, transitional spaces must be redefined not as excess land but as *essential social infrastructure*. This reframing should inform national housing standards, design briefs, and local zoning codes, ensuring that every project includes spatial allocations for informal gathering, neighbor interaction, and cultural expression. Second, planning processes must become more participatory and ethnographic—engaging future residents early to uncover their spatial habits, cultural norms, and aspirations. This would enable more context-responsive and socially embedded design outcomes.

A cultural shift in the professional mindset is needed. Architects, urban planners, and housing agencies must be trained to see space not just in terms of physical measurements but in terms of human behavior, social potential, and emotional resonance. In particular, educational institutions must update their curricula to equip professionals with tools for understanding the informal, the everyday, and the relational dimensions of space-making.

Future research should deepen its inquiry into the longitudinal impact of transitional space design on neighborhood outcomes—such as safety, mental health, youth development, and civic participation. Comparative studies across cities or regions within the Philippines could also help identify adaptable typologies and best practices for different urban contexts. Likewise, the integration of spatial technologies—like GIS mapping, community co-design apps, and post-occupancy analytics—could help in both planning and evaluating the effectiveness of transitional space interventions.

The success of low-rise row housing in cities like Cebu cannot be measured solely by shelter provision. True success lies in creating places that foster human connection, cultural continuity, and collective resilience. Transitional spaces, if thoughtfully designed and institutionally supported, can be the fulcrum upon which these aspirations pivot—bridging not only the private

and the public, but the personal and the collective, the physical and the emotional, the designed and the lived.

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Embodying Resistance Through Ritual and Identity in the Afro-Colombian Currulao Dance Tradition

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Abstract

This paper explores Currulao, an Afro-Colombian dance tradition from the Pacific coast, as a site of embodied resistance, ancestral memory, and cultural sovereignty. Far from being a static folkloric form, Currulao operates as a dynamic archive of Black survival, where rhythm, ritual, and territory intersect. Drawing on interdisciplinary perspectives from performance studies, African diaspora theory, and ethnography, the study examines how Currulao encodes histories of colonial violence while simultaneously enabling contemporary acts of political and cultural reclamation. Through attention to sonic structures, gendered embodiment, territorial choreography, and transnational adaptation, the paper argues that Currulao is not only a cultural expression but a form of kinetic knowledge. In the face of displacement, commodification, and systemic marginalization, Afro-Colombian dancers mobilize Currulao as a space of refusal—where identity is not only remembered but performed. Ultimately, the dance offers a decolonial model of cultural continuity and transformation, where sovereignty is sensed through rhythm, and resistance is choreographed through joy, care, and ancestral invocation.

Keywords: Afro-Colombian dance, Currulao, embodied resistance, cultural sovereignty, ritual performance, African diaspora, Black geographies

1. Introduction

In the dense rainforests and riverine towns along Colombia's Pacific coast, the Currulao dance tradition endures as a living expression of Afro-descendant resilience, memory, and identity. More than a performative genre, Currulao functions as a cultural continuum—a sustained embodiment of communal values, ancestral knowledge, and historical survival in a region long marked by marginalization and extractive economies. Predominantly practiced in departments such as Chocó, Valle del Cauca, and Nariño, the Currulao is woven into everyday life: from religious observances and funerary rites to public festivals, village gatherings, and diasporic return rituals.

Rooted in the transatlantic legacies of African displacement and reinvention, Currulao traces its origins to Bantu-speaking groups brought to the Colombian Pacific during the colonial era. Its rhythmic structures and call-and-response singing styles preserve spiritual and sonic frameworks that resist cultural erasure. The use of traditional instruments such as the *marimba de chonta*, *cununo*, *bombo*, and *guasá* reflects centuries of adaptation to local materials and

ecosystems while maintaining African epistemologies of sound and collective expression.

As a dance, Currulao articulates a community's sense of place and belonging through synchronized footwork, spiraled gestures, and fluid exchanges between male and female performers. Movements are not merely aesthetic; they encode cosmologies, courtship customs, territorial belonging, and generational teachings. In village contexts, dance rehearsals double as sites of socialization, oral history transmission, and moral education. In this way, Currulao is less a bounded performance and more a cultural infrastructure, sustaining black life in the face of infrastructural neglect.

Importantly, Currulao has survived despite systemic exclusion of Afro-Colombian communities from national narratives of culture and citizenship. Its endurance through centuries of slavery, militarization, and neoliberal abandonment signals not only cultural resilience but also a political stance: an embodied refusal to disappear. Today, the dance continues to evolve, finding expression in urban folkloric groups, classroom pedagogies, and international festivals—yet it remains anchored in the coastal communities whose histories and futures it continues to animate.

2. Ritual Time, Ancestral Memory, and Sonic Structure

2.1 The Symbolic Function of Marimba, Cununo, and Guasá Instruments

Currulao is not merely heard; it is lived through the body. The core of its sonic landscape is built from a triadic interplay of the *marimba de chonta*, *cununo* drums, and *guasá* rattles, each of which carries both symbolic and functional resonance within Afro-Colombian ritual life. These instruments are not simply musical tools but sonic agencies—cultural technologies through which memory, power, and cosmological relations are activated. Their sounds are imbued with spiritual significance, believed by many communities to summon ancestral presences, purify ritual space, and recalibrate bodily energy.

The *marimba de chonta*, with its resonant wooden keys and natural gourds or bamboo resonators, serves as the melodic anchor of Currulao. The construction of the marimba itself is a ritualized process, often involving careful selection of *chonta* palm wood and ceremonial cleansing

before use. In performance, the marimba's cascading pentatonic tones provide an auditory environment that is both repetitive and modulating, producing what some scholars describe as circular soundscapes. These sonic cycles echo not only African musical idioms but also local river flows, bird calls, and forest rhythms—positioning the dance as a form of eco-sonic embodiment (Ochoa Gautier, 2014).

Supporting the marimba are the *cununo* and *bombo* drums—two percussive voices that alternate between dialogue and grounding. The *cununo* typically provides syncopated accents, while the *bombo* lays down a steady pulse that anchors dancers' footwork. The *guasá*—a shaker made from dried gourds filled with native seeds—completes the rhythm section with a textured, almost breathing quality. Many dancers and musicians describe this sound as the voice of the earth or the whispers of the dead. Together, these instruments create not only rhythm but ritual affect, a sonic environment that facilitates altered states of consciousness and social cohesion.

In the context of Afro-Colombian spirituality—heavily influenced by African diasporic cosmologies such as Palo Monte and ancestor veneration—sound is not neutral. The playing of these instruments, especially during extended community rituals like *velorios* or *fiestas patronales*, is said to "clear the road" (*abrir el camino*) for spirits to enter the human world. Such practices speak to a belief in the porousness of ritual space, where sound bridges the visible and invisible. The instruments of Currulao thus function as ritual agents, shaping what Victor Turner might call "communitas" by dissolving social hierarchies through shared rhythmic immersion.

2.2 Ritual Choreography and Its Cyclical Temporality

Currulao choreography does not conform to Western conventions of climax, progression, or narrative resolution. Rather, it unfolds within what ritual theorist Catherine Bell (1992) would call a ritual frame—a performative space governed by repetition, transformation, and symbolic condensation. Dancers, usually arranged in circular, lateral, or mirrored pairs, engage in sequences that loop rather than conclude. These cycles mirror cosmologies where time is not linear but layered, spiral, and iterative—a quality shared by many

African-derived traditions across the Americas.

The temporality of Currulao emerges not only from movement but from its alignment with musical structure. The marimba's looping phrases allow dancers to enter what could be called rhythmic trance: a mode of presence where attention is decentralized, and memory is accessed not through words but through step, posture, and muscle. Dancers describe this experience as "dejando que el cuerpo escuche"—letting the body do the listening. It is in these moments that dancers become mediums of history, not merely interpreting past trauma but living it in real time through somatic re-enactment.

Currulao events, particularly in rural or ritual contexts, often extend for many hours or even overnight. The duration itself is meaningful, as fatigue gives way to altered perception and collective endurance. These extended sessions shift Currulao from being a social dance into being a ritual technology—a system for accessing what Paul Gilroy (1993) called the "diasporic double consciousness," where multiple temporalities and positionalities coexist. The choreography, in this sense, is less about steps and more about sustaining presence in the face of historical displacement.

2.3 Dance as Invocation of Ancestral Presence

In the Afro-Pacific cosmologies that shape Currulao practice, the body is not a vessel to be transcended, but a sacred archive—a moving archive of memory, loss, and return. Dancers carry stories in their hips, knees, and shoulders; these are not merely anatomical expressions but spiritual channels. The notion of "dancing with the ancestors" is not metaphorical but literal for many performers who claim to feel ancestral guidance during ritual movement. This is particularly visible in community events such as *novenarios* (nine-day mourning periods), where dance is central to honoring the dead and guiding spirits into the afterlife.

These embodied invocations are particularly intense when dancers reach a state of ritual resonance with the music, often marked by synchronized breath, sweat, and gaze. The dancer's body in these moments transcends individuality and becomes what Yvonne Daniel (2005) might call a "kinesthetic archive"—holding historical trauma and intergenerational resistance through movement. Rather than erase pain, Currulao encodes it,

giving form to unspeakable pasts through rhythm, repetition, and symbolic gesture.

The experience of being "mounted" by ancestral presence—a concept found across African diasporic religions such as Vodun, Candomblé, and Palo—is echoed in Currulao's extended dances. While the community may not always label it possession in theological terms, the bodily phenomena—shaking, altered gaze, increased tempo—are recognized signs of spiritual encounter. These moments are accepted, even expected, within the cultural logic of Currulao, and signal that the ritual has fulfilled its purpose: not entertainment, but communion.

In this frame, dance becomes not only a political act but an ontological one. It reclaims black embodiment from colonial pathologization and repositions it as sacred, knowledgeable, and sovereign. Currulao's dance language—through hips that speak, feet that echo, and arms that invoke—is a grammar of survival. It transmits what was not written, and it does so with authority.

3. Blackness, Territory, and the Body as Archive

3.1 Movement as Territorial Reclamation in Postcolonial Landscapes

Currulao emerges not only as a choreographic tradition but as a spatial practice—a way of inhabiting, reclaiming, and re-signifying the territories that Afro-Colombian communities have historically occupied along the Pacific coast. In regions like Nariño and Chocó, where ancestral land titles are still contested and often under threat from state-backed extraction, paramilitary violence, and ecological displacement, dance becomes a tactic of emplacement. Through footwork and spatial formations, dancers inscribe presence into land that has been mapped out of legal or urban visibility.

Dancing Currulao is thus an act of territorial resistance. It asserts "we are still here" against a background of land dispossession and extractivist development. Particularly in rural contexts, dance stages are set on dirt floors, riverbanks, and cleared communal spaces—sites imbued with both memory and survival. The choreographic pattern, which often involves advancing toward and retreating from a partner, can also be read as a metaphor for the push and pull between forced displacement and ancestral rootedness. In this reading, the stage is not neutral; it is a terrain of memory, contested yet

claimed through the act of dancing.

Territoriality in Currulao is not abstract—it is linked to specific geographies: river crossings, mangrove edges, fishing routes. The dancer's movement does not just happen on the land; it happens with the land, echoing a broader Afro-diasporic ethic that sees land not as a commodity but as kin. Currulao thus becomes a choreography of place-making, where rhythm and territory converge to reassert black geographies in a postcolonial state.

3.2 Riverine Geographies and Ecological Embodiment

The Pacific coast of Colombia is shaped by water: vast river systems like the San Juan, Baudó, and Atrato form the lifeblood of Afro-descendant communities, guiding their economic practices, seasonal cycles, and spiritual beliefs. Currulao, as a tradition born from and with this ecology, reflects an aquatic epistemology—a way of knowing shaped by tides, currents, and humidity. Dancers often mimic the flow of water in their gestures: smooth shoulder rolls, undulating hips, and gliding footwork evoke the rhythms of the river and the ocean. This ecological embodiment situates Currulao not only in the forest, but in the water that surrounds and sustains it.

Beyond aesthetics, such movement articulates a relational politics of environment, distinct from Western environmentalism. In Afro-Colombian frameworks, the body is not separate from its environment; it is a continuation of it. When dancers perform Currulao, they do so not just on the land but as the land. The sensuality of the dance—the wet skin, the barefoot steps, the swaying waist—does not exoticize nature, but affirms the body's entwinement with it. It transforms dance into a form of environmental testimony, countering narratives that depict black communities as either ecological victims or passive inhabitants.

This ecological perspective is further emphasized in ritual Currulao performances conducted during river-based ceremonies, such as *lavado de muertos* (washing of the dead) or *bautismos de agua* (water baptisms). These moments blend movement, music, and nature into a single performative ecosystem. The choreography is not imposed upon the environment but emerges from it. Currulao, in this sense, is both an ecological practice and a political one—mobilizing the aesthetics of the river to affirm Afro-Colombian claims to place,

dignity, and sustainability.

3.3 Dance as Memory Inscription and Historical Survival

Currulao not only tells a story—it remembers a history that was forcibly erased. In a national context where Afro-Colombian experiences have long been marginalized, the dance becomes a counter-archive, preserving what colonial documents could not or would not record. The body becomes the medium of transmission, and movement becomes its language. Foot patterns recall migration paths, torso movements echo boat rowing, and call-and-response songs contain coded references to survival strategies during enslavement.

In this way, Currulao performs what Michel-Rolph Trouillot (1995) calls "silences in history": the absences, the gaps, the things never written but always lived. Each dancer, particularly elders and community maestros, serves as a living library, whose gestures encode decades, even centuries, of political and cultural navigation. These bodily narratives challenge state-sanctioned versions of Colombian identity that have long privileged mestizaje while erasing the black and indigenous contributions to the nation.

Moreover, Currulao allows for the simultaneity of pain and joy, a hallmark of black expressive culture across the diaspora. In the same breath, the dance can mourn and celebrate, resist and heal. The steps—measured, weighted, rhythmic—carry the burden of displacement, but they also release it into collective rhythm. In doing so, Currulao generates a space of historical intimacy, where the act of dancing together becomes an act of memory justice.

Through Currulao, history is not something to be studied in archives or museums—it is something to be felt, sweated out, repeated, and shared. The dance thus reclaims not only bodily presence but historical authority. It affirms that the black body, long treated as a site of labor and violence, is also a site of profound knowledge and resistance.

4. Gendered Expressions and Embodied Matriarchy

4.1 Female Leadership in Choreography and Transmission

Although Currulao is often perceived through the lens of heteronormative partner dance—with men and women engaging in flirtatious

exchanges—such a reading overlooks the central role that women play as cultural bearers, choreographers, and spiritual leaders within the Afro-Colombian Currulao tradition. In many communities across the Pacific, particularly in Guapi, Timbiquí, and Tumaco, it is elder women—often referred to as *matronas*—who organize dance rehearsals, lead marimba ensembles, and determine the ritual content of performances. Their authority is not derived from formal institutions but from embodied experience, genealogical knowledge, and communal trust.

This female leadership is particularly visible in the domestic and communal spaces where Currulao is taught. Girls learn dance steps by mimicking mothers and grandmothers during household chores or festival preparation, with no need for formal instruction. This form of transmission reflects what feminist anthropologist Diana Taylor (2003) calls "the repertoire"—a mode of embodied knowledge transfer that exists outside of written archives and legitimizes affective, tactile, and intergenerational pedagogies. In this repertoire, women are not passive carriers of culture but active architects of memory and style.

Moreover, in many Currulao groups, the role of the lead singer—often called the *cantadora*—is held by an older woman whose voice both directs the musicians and mediates the spiritual atmosphere of the event. These women hold the power to improvise verses that reference personal grief, community struggles, or even political critique—wrapped in poetic form. As such, their leadership transcends choreography and enters the realm of communal storytelling and social intervention, reaffirming matriarchal authority not only in dance but in cultural discourse.

4.2 Currulao as a Space for Embodied Care and Resistance

The dance floor in Currulao is not simply a space for aesthetic expression or entertainment—it is a terrain of care, where gendered bodies reassert presence through softness, strength, and relational movement. Female dancers often deploy gestures that simultaneously communicate sensuality, labor, and community rhythm: swaying hips echoing the rhythm of pounding rice, balancing shoulders recalling the posture of carrying water, and focused gazes asserting agency rather than

submission. These gestures do not conform to colonial models of femininity; rather, they articulate a black feminist praxis rooted in daily survival and celebration.

In this context, Currulao becomes a dance of embodied resistance. It refutes the hyper-sexualized or exoticized portrayals of Afro-descendant women that dominate national media and tourism. Instead, it offers an affirmative space where black women's bodies are central—not as spectacle, but as source. Through repetition, grounded posture, and muscular control, female dancers convey dignity and vitality without needing to adhere to Western standards of grace or polish.

Furthermore, the bodily configurations in Currulao often reverse the expected gender hierarchies. While male dancers may initiate movement, it is frequently the woman who determines pacing, spatial proximity, and expressive range. Her refusal or acceptance of advances within the dance sequence becomes symbolic of broader negotiations of autonomy, consent, and intersubjectivity. In this sense, Currulao operates as a rehearsal for sovereignty, allowing women to shape relational dynamics in a world that too often denies them such agency.

Ultimately, the Currulao stage—whether in a coastal village square or an urban cultural center—becomes a microcosm of Afro-diasporic matriarchy. It centers bodies that have historically been pushed to the margins and affirms their power not just to survive, but to choreograph the future.

5. Resistance in Motion: Colonial Shadows and Contemporary Frictions

Currulao is not merely a folkloric tradition preserved in time—it is a living act of resistance, continuously reshaped by the tensions between history, territory, and structural inequality. While the dance is often presented in national and international arenas as a vibrant marker of Colombian multiculturalism, this aestheticization often conceals the deep layers of resistance embedded in its rhythm and gesture. For Afro-Colombian communities, particularly along the Pacific littoral, Currulao is not simply a performance. It is an act of refusal—a refusal to be erased, commodified, or rendered silent in the face of enduring colonial logics.

The dance itself emerged from conditions of racialized dispossession. Enslaved Africans and their descendants developed Currulao not only

as a mode of survival, but as a coded language through which cultural memory could be preserved under watchful colonial eyes. The very structure of Currulao—the call-and-response singing, the coded lyrics, the complex footwork—functioned as a cultural cipher. Through gesture and rhythm, dancers negotiated identity, kinship, and defiance, even within systems of violent surveillance.

In today's Colombia, the colonial shadow persists in the form of territorial extraction, systemic underinvestment in black communities, and symbolic exclusion from the national imagination. Currulao continues to carry the weight of these historical injustices, but it also transforms them. Through its communal embodiment, the dance enacts what Ngũgĩ wa Thiong'o calls "decolonization of the mind"—but here it is through the body. The body, once marked as property or labor, now performs sovereignty.

Yet, Currulao's resistant power is not static. It navigates a complex and sometimes contradictory relationship with the state and market. On one hand, national cultural institutions now promote Currulao as part of a multicultural brand, funding festivals and educational initiatives. On the other hand, this visibility often comes at the cost of contextual erasure—where Currulao is stripped of its political force and recast as exotic entertainment. Afro-Colombian performers frequently confront the pressure to sanitize their traditions for touristic or institutional consumption, diluting the oppositional grammar that gives Currulao its enduring power.

These frictions are further exacerbated by internal community tensions. In urban centers like Cali and Bogotá, where displaced Afro-Colombians attempt to sustain Currulao amidst poverty and xenophobia, debates have emerged over authenticity, appropriation, and the limits of performance. Can Currulao be adapted to contemporary stages without losing its soul? Who controls the narrative of its transmission? These are not merely aesthetic questions—they are political ones, asking whose history gets preserved, who is allowed to speak through dance, and under what conditions.

Despite these challenges, Currulao persists as a kinetic archive of resistance. Its choreography is neither naive nor neutral. It is tactical, encoded, and alive. In each step, the dancer invokes centuries of survival, transforming repetition into resilience. In each beat of the marimba, there is a counter-beat to empire. In each turn of the body, there is a turn away from silence and toward sovereign movement. Currulao may exist within the cracks of the nation-state, but it expands them, reminding us that black freedom does not always march—it dances.

6. Transmission and Transformation across Generations

Currulao survives not simply because it is beautiful, but because it is transmitted—from grandmother to granddaughter, from village to city, from coastal rivers to international stages. The dance lives within and beyond bodies, reshaped by generations of Afro-Colombian knowledge-keepers who have ensured its persistence despite displacement, urbanization, and cultural commodification. This transmission is neither linear nor neutral; it is always affected by historical rupture, socio-economic pressure, and creative adaptation.

In rural communities such as Tumaco, López de Micay, and Guapi, Currulao is still taught informally, through embodied repetition, household play, and community festivals. Children learn the dance not through choreography sheets but through watching, mimicking, and being watched. These intergenerational exchanges carry ethical as well as aesthetic value. The elders who lead rehearsals are not merely dance instructors—they are guardians of rhythm, memory, and place. Their authority is built not on institutional certification but on lived experience, ritual literacy, and community trust. In this context, learning Currulao is not just learning steps—it is learning how to live Black, with dignity and joy, in a world that devalues both.

Yet, this system of transmission has increasingly come under pressure. Migration to urban centers, the growth of public arts education, and the rise of digital platforms have transformed how Currulao is learned, performed, and understood. In cities like Cali, Medellín, and Bogotá, Afro-Colombian youth are often taught Currulao in schools, cultural centers, or university workshops—settings that introduce standardized forms, theatrical conventions, and pedagogical hierarchies unfamiliar to village-based practice. While these programs can offer visibility and mobility, they also risk

flattening Currulao into a codified performance genre, severed from its ritual and territorial contexts.

This urbanization of Currulao has given rise to creative tensions. On one hand, younger dancers reimagine Currulao through fusion with hip-hop, contemporary dance, and experimental theatre. These innovations allow the form to speak to modern realities—violence, precarity, diaspora—while still holding onto its Afro-Pacific essence. On the other hand, elders and tradition-bearers often worry about the loss of depth, warning that rhythm without context is choreography without memory. This dialectic—between fidelity and innovation, continuity and rupture—mirrors the broader struggles of Afro-diasporic cultural survival.

Technology has also complicated transmission. YouTube videos, TikTok clips, and Instagram reels have enabled Currulao to travel far beyond Colombia's borders, inspiring dancers in Brazil, the United States, and Europe. Yet, in its digitized form, Currulao is often reduced to movement patterns devoid of ancestral codes. The relational energy between dancer, drummer, and community—central to the dance's ritual power—is difficult to reproduce through screens.

Despite these frictions, the adaptability of Currulao is its strength. It is not a relic, but a rhythm that changes without breaking. It can survive the migration from riverbank to studio, from ritual to stage, because it is rooted in the body's ability to remember, resist, and reimagine. For each generation, Currulao offers a language of movement that speaks of survival without apology. It tells young dancers that they are not alone, that their feet are not just instruments of grace but vehicles of history, and that through dance, they can claim space in a nation that often denies their presence.

Currulao does not fear change—it dances with it. In doing so, it ensures that Afro-Colombian identity remains not only remembered but re-performed, one generation at a time.

7. Currulao in Diaspora and Global Performance Circuits

Currulao has always been a dance of movement—between bodies, across rivers, and increasingly across borders. In the past two decades, as Afro-Colombian communities have migrated to major cities within Colombia and beyond, Currulao has traveled with them, transforming into a diasporic cultural practice that is both rooted and mobile, traditional and reinvented. Its rhythms now echo in neighborhoods of Cali and Medellín, but also in community centers in Madrid, festivals in New York, and Afro-Latinx collectives in São Paulo. With each relocation, Currulao enters new stages—geographic, political, and performative—raising questions of authenticity, appropriation, and cultural sovereignty.

In the Colombian diaspora, particularly among Afro-Colombian migrants displaced by conflict or seeking economic opportunity, Currulao becomes a bridge to belonging. For families navigating unfamiliar landscapes and systemic exclusion, performing Currulao in plazas, parks, or immigrant rights events functions as both affirmation and refusal: a way to assert Black cultural identity while resisting the homogenizing forces of exile. In this context, dance becomes survival—not in a folkloric sense, but as a means of preserving dignity and coherence across ruptured geographies.

At the same time, Currulao has entered global circuits of performance—world music festivals, multicultural showcases, academic symposiums, and digital archives. International demand for "authentic" Afro-Colombian expression has created new opportunities for professionalization, especially for groups based in urban centers. Choreographed Currulao pieces are now performed on formal stages, complete with lighting design, costume stylization, and narrative arcs tailored to foreign audiences. While this global visibility brings recognition and economic benefit, it also comes at a cost: the risk of cultural compression, where complex spiritual and territorial meanings are flattened into consumable spectacle.

Many dancers and cultural leaders express concern about the aestheticization of resistance—where Currulao is celebrated for its beauty while its political and historical dimensions are ignored. In some cases, government-backed cultural diplomacy promotes Currulao abroad as part of Colombia's multicultural image, even as Afro-Pacific communities back home continue to face neglect, violence, and displacement. This dissonance reflects what performance theorist Diana Taylor (2003) describes as "the politics of display"—where who gets to perform, for whom, and under what conditions becomes a matter of national branding rather than cultural

justice.

Yet, within the diaspora and global stage, Currulao also opens spaces for transformation and re-signification. Afro-descendant dancers in New York, Barcelona, and Buenos Aires have begun fusing Currulao with other black diasporic forms—Afrobeat, samba, hip-hop, rumba—creating hybrid expressions that speak to contemporary experiences of race, migration, and memory. These experimental forms are not betrayals of tradition; they are acts of diasporic authorship, where cultural inheritance is neither static nor sacred, but a living archive in motion.

In these cross-border adaptations, the core principles of Currulao remain: collective rhythm, embodied knowledge, intergenerational transmission. Whether danced on a dirt floor in Tumaco or a university auditorium in Berlin, Currulao insists on Black presence—not as object, but as agent. It is a rhythm that remembers, resists, and remakes the world across languages, borders, and bodies.

8. Rhythms of Refusal: Toward a Politics of Embodied Cultural Sovereignty

Currulao, in its many forms and evolutions, embodies more than rhythm—it embodies refusal. A refusal to be silenced, to be reduced, to be rendered invisible within the colonial and national orders that have long excluded Afro-Colombian life. In the hips of a grandmother, in the voice of a *cantadora*, in the calloused feet of a teenager dancing barefoot at dusk, Currulao carries a politics that does not require manifesto—it is articulated through motion, gesture, and breath.

At its core, Currulao asserts a claim to cultural sovereignty—not merely the right to preserve tradition, but the power to define, reconfigure, and transmit culture on one's own terms. This sovereignty is not granted by the state nor recognized by cultural institutions. It is performed, daily, on community stages, school yards, riverbanks, and city streets. In this sense, Currulao offers a model of resistance not grounded in protest alone, but in presence: to dance, visibly and unapologetically, is to refuse erasure.

This politics is deeply embodied. While legislative frameworks and ethnic recognition laws have offered Afro-Colombian communities limited protections, it is in performance—particularly in dance—that true autonomy is felt and enacted. Currulao enables

a mode of knowing and being that transcends written discourse. It speaks the language of collective memory, of territory held in movement, of cosmology carried in cadence. In Currulao, sovereignty is not only about land or law—it is about rhythm.

Yet, this sovereignty is fragile. As neoliberal forces seek to commodify Black culture, and as urbanization and displacement continue to reshape Afro-Pacific geographies, Currulao dancers must constantly navigate the line between expression and exploitation. The challenge is not only to preserve the form, but to preserve the context, to ensure that Currulao remains tethered to the histories, spirits, and ecosystems that birthed it.

And still, Currulao dances on. It dances in festivals and funerals, in protests and processions, in the shadow of palm trees and on concrete school stages. It teaches that resistance need not always be loud—sometimes it is syncopated. Sometimes it is slow, deliberate, grounded. Sometimes it is the lift of a hand, the turn of a head, the shared breath of a community moving as one.

In the embodied knowledge of Currulao lies a future—a decolonial, diasporic, Black future—that is not utopian, but possible. A future where sovereignty is not imagined as separation, but as the freedom to dance, to speak, to breathe, and to remember in one's own time and rhythm. Currulao does not ask permission. It opens the circle, and invites the ancestors, the community, and the world to feel what sovereignty sounds like when it moves.

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