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From Node to Cultural Interface: A Node–Place–Narrative Framework for Contemporary Railway Station Buildings

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Abstract

Railway station buildings increasingly operate as civic landmarks, public interiors, and cultural interfaces as well as mobility infrastructure. This study asks how architectural design integrates transport performance, public-space formation, and cultural meaning. A qualitative multiple-case study examines St Pancras International (London, United Kingdom), Rotterdam Centraal (Rotterdam, the Netherlands), Liège-Guillemins Station (Liège, Belgium), and Hong Kong West Kowloon Station (Hong Kong, China). Cases were selected for maximum variation in design logic and documented evidence. Official, heritage, practice, and scholarly sources were triangulated; documented features were deductively coded through a Node–Place–Narrative protocol and then compared across cases. Node captures movement and connectivity, Place captures public use and urban integration, and Narrative captures the meanings attributed to heritage, structure, materiality, landscape, and arrival. The analysis identifies four mechanisms: heritage reactivation, urban legibility, structural symbolism, and landscape-civic integration. Across the cases, transport performance is a necessary enabling condition, whereas cultural distinctiveness emerges when public-space and narrative strategies are spatially integrated. The study extends the node-place model at the building scale, clarifies the boundary between place performance and narrative interpretation, and offers transferable—but context-dependent—principles for culturally responsive transport architecture. Because the evidence is documentary rather than user-based, the framework supports analytical comparison rather than performance scoring.

Keywords: railway station buildings; cultural interface; Node–Place–Narrative framework; architectural design; public space; place-making; transport architecture; urban identity

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Academic Editor: Haifeng Liao

Received: 31 May 2026
Revised: 3 July 2026
Accepted: 5 July 2026
Published: 6 July 2026

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1. Introduction

Railway station buildings occupy a special position in the contemporary built environment. They are at once transportation facilities, public interiors, urban landmarks, commercial platforms, and symbolic gateways. While their primary role is to organize passenger movement, their broader architectural significance lies in the ways they shape urban experience, local identity, and collective memory [1–3]. In this sense, the railway station is not only a technical object within a transport system, but also a cultural and spatial interface between infrastructure and city life.

The conventional understanding of railway stations has often emphasized transport capacity, network accessibility, passenger flow, and operational efficiency. These concerns remain essential, especially as cities continue to expand rail-based mobility systems and multimodal transport hubs. However, this functional perspective cannot fully explain why

certain station buildings become memorable urban places, while others remain anonymous transit containers. A station may satisfy basic transportation requirements but still fail to create civic recognition, emotional attachment, or meaningful spatial experience.

Bertolini's node-place model has provided a foundational framework for understanding railway stations as both transport nodes and urban places [1,4]. The node value refers to the quality and intensity of transport connections, while the place value refers to the concentration of urban activities, land uses, and development opportunities around the station. Later studies have extended this model by incorporating station-area development potential, sustainable transition, pedestrian accessibility, design quality, ridership, and temporal dynamics [5–10]. These studies have significantly deepened the understanding of station areas as complex urban systems.

Nevertheless, when the research focus shifts from station-area planning to the architectural design of station buildings, the node-place model alone is not sufficient. A station building is not only a point in a mobility network or a development catalyst in an urban district. It is also a built environment composed of thresholds, halls, roofs, platforms, concourses, façades, plazas, landscape interfaces, commercial programs, waiting areas, public art, and symbolic forms. These architectural components shape how users move, pause, look, gather, remember, and understand the city.

The architectural and design value of station buildings becomes clearer when they are understood as places rather than mere nodes. Place-based urban theory has long emphasized imageability, lived experience, public life, and the relationship between architecture and local identity [11–18]. From this perspective, a railway station is not merely a functional device for boarding and transfer. It is a repeated everyday environment for residents, a first encounter with the city for visitors, and a spatial threshold through which mobility becomes attached to memory and meaning.

This study therefore examines railway station buildings as cultural interfaces. In this paper, a cultural interface refers to an architectural environment that mediates between mobility and meaning. It is a built form through which users encounter local history, urban identity, public life, landscape, symbolic expression, and collective memory. This concept is particularly relevant to contemporary transport architecture because station buildings often shape the first impression of a city and remain among the most frequently used public buildings in everyday urban life.

Four cases are selected for comparative analysis: St Pancras International in London, United Kingdom; Rotterdam Centraal in Rotterdam, the Netherlands; Liège-Guillemins Station in Liège, Belgium; and Hong Kong West Kowloon Station in Hong Kong, China. The selection is not based on a Japanese/non-Japanese distinction or on a national hierarchy. Instead, it follows a maximum-variation logic: the cases combine contrasting historical periods, urban conditions, and design mechanisms while offering sufficient public documentation for source triangulation. Their geographic diversity reduces the risk of treating one national design model as universal and enables the framework to be tested across heritage reactivation, urban legibility, structural symbolism, and landscape-civic integration.

The main purpose of this study is to clarify how creative architectural strategies enable railway station buildings to move beyond mobility. To achieve this aim, the paper develops a Node–Place–Narrative framework. The node dimension concerns transportation function, circulation, connectivity, and efficiency. The place dimension concerns public space, spatial comfort, accessibility, and urban integration. The narrative dimension concerns cultural memory, symbolic expression, material language, landscape framing, and experiential meaning.

To guide the analysis, this study addresses the following research questions:

RQ1. How do contemporary railway station buildings move beyond transport efficiency to operate as culturally meaningful public environments?

RQ2. Through what architectural strategies are mobility, public space, and cultural narrative integrated in selected railway station buildings?

RQ3. How can the proposed Node–Place–Narrative framework contribute to the analysis and future design of culturally responsive transport architecture?

These questions allow the study to move beyond descriptive case analysis. Rather than evaluating the selected stations only as isolated architectural works, the paper examines how their design strategies connect transport performance, public-space formation, and cultural meaning. This approach also helps clarify the broader relevance of railway station buildings as civic infrastructures within contemporary urban development.

The contribution of this paper is threefold. First, it extends railway station research by introducing the narrative dimension into the established node-place discussion. While previous studies have examined station areas through transport accessibility, land use, design quality, ridership, and public-space value, the cultural and architectural narrative of the station building itself remains less fully theorized. Second, the study develops the concept of the railway station as a cultural interface, emphasizing how architecture mediates between mobility systems, public life, urban identity, and spatial memory. Third, by comparing four internationally recognized railway station buildings, the paper identifies four transferable architectural strategies—heritage reactivation, urban legibility, structural symbolism, and landscape-civic integration—that may inform future station design and transport-oriented public architecture.

2. Literature Review

2.1. Railway Stations as Mobility Nodes and Urban Places

Railway stations have long been central to the development of modern cities. Historically, they connected cities to regional, national, and international networks, while also shaping urban expansion, commercial concentration, and social movement. In contemporary urbanism, stations continue to play this dual role. They are technical infrastructures that enable mobility, but they are also highly visible public buildings that influence the spatial structure and image of the city.

The node-place model proposed by Bertolini is one of the most influential frameworks for understanding this duality [1,4]. In this model, a station area is considered both a node within a transport network and a place within an urban environment. The node value is associated with transport accessibility, frequency, connectivity, and network importance, while the place value is associated with land-use intensity, urban activities, density, and development potential. This model has been widely used in transport planning, transit-oriented development, and station-area classification.

Subsequent studies have refined this approach by examining station-area potential, sustainable transitions, walking accessibility, design quality, network criticality, ridership, and time-based dynamics [5–9]. For instance, Zhang et al. integrated network criticality with the node-place-design model to classify metro station areas in Greater London [7]. Vale combined the node-place model with pedestrian shed ratio to evaluate station areas in Lisbon [8]. Amini Pishro et al. further proposed a Node–Place–Ridership–Time model for rail-transit stations, emphasizing the need to account for ridership and temporal variations in station evaluation [9].

Transit-oriented development literature also provides a useful background for understanding the relationship between rail infrastructure and urban growth [10,19,20]. However, much of this work focuses on station areas, land use, accessibility, density, and transport integration. These are important concerns, but they do not fully capture the architectural

experience of the station building itself. From an architectural design perspective, the station is not merely a point in a network or a development zone. It is a constructed spatial environment in which material form, structure, light, movement, public space, and cultural meaning intersect.

Recent studies have increasingly emphasized the public-space value of railway stations. Otsuka and Reeve argue that railway stations and their adjacent areas can be understood as public spaces whose design and management influence the attractiveness of rail journeys [2]. Alexander and Hamilton similarly discuss the community role of local railway stations and their capacity to generate place value [3]. These studies are important because they shift attention from the station as a technical facility to the station as a social and spatial environment. Yet further work is still needed to understand how architectural design itself contributes to the cultural and narrative qualities of station buildings.

2.2. Station Buildings, Place-Making, and Urban Identity

The concept of place-making is central to understanding why railway station buildings matter beyond transportation. Place-making refers to the process through which physical environments acquire social, cultural, and experiential meaning. A station becomes a place when it supports orientation, encounter, waiting, memory, symbolic recognition, and civic use.

Classic theories of place and urban image remain useful for this discussion. Lynch argued that people understand cities through recognizable spatial elements such as paths, edges, districts, nodes, and landmarks [11]. Railway stations often operate simultaneously as paths, nodes, and landmarks. Tuan emphasized the experiential difference between space and place, suggesting that place emerges when space becomes meaningful through human experience [12]. Relph's critique of placelessness is also relevant because many contemporary transport environments risk becoming standardized and anonymous [13]. Norberg-Schulz further connected architecture with genius loci, arguing that buildings should help reveal the character of their surroundings [14].

Public-space studies offer another important perspective. Gehl emphasizes the relationship between urban form, human-scale activity, and life between buildings [15]. Whyte's observations of small urban spaces demonstrate that successful public environments depend on use, comfort, visibility, seating, access, and social behavior [16]. Jacobs highlights the importance of everyday urban vitality, mixed activities, and street life [17]. Carmona provides a comprehensive urban design framework for understanding how public places are shaped by social, functional, perceptual, morphological, visual, and temporal dimensions [18]. Other public-space studies further emphasize accessibility, ownership, activity, vitality, and social interaction as essential components of meaningful urban places [21–24]. Together, these studies suggest that a station building should be evaluated not only by its capacity to move people, but also by its ability to support public life.

Station-based place-making may occur through several architectural strategies. A station may preserve and reinterpret historical fabric, as in St Pancras International. It may create a transparent civic hall connected to surrounding urban districts, as in Rotterdam Centraal. It may use structure and form to produce a new urban symbol, as in Liège-Guillemins Station. It may transform its roof, plaza, and underground concourse into a landscape-oriented public space, as in Hong Kong West Kowloon Station. In all these situations, architectural design does more than solve circulation. It gives spatial form to arrival, transition, and urban recognition.

This issue is especially important because many contemporary transport hubs risk becoming generic environments. Large station buildings often rely on standardized circulation systems, commercial layouts, digital signage, and security procedures. While

these systems are necessary, excessive standardization may weaken local character. The challenge for creative architectural design is therefore to maintain operational clarity while avoiding placelessness.

2.3. Cultural Interface as an Architectural Design Concept

The term "cultural interface" is used in this study to describe the architectural role of station buildings as mediators between infrastructure and cultural meaning. Unlike a museum or cultural center, a station does not usually present culture through curated exhibitions alone. Instead, it communicates culture through spatial sequence, material memory, structural expression, threshold design, landscape connection, public art, and everyday use.

This concept is informed by theories of socially produced space, non-place, tourist experience, creative place-making, architectural atmosphere, and tectonic expression [21,22,25–34]. Lefebvre's theory of the production of space suggests that space is not a neutral container but is socially, materially, and symbolically produced [25]. Augé's concept of non-place is useful for understanding the risk that standardized transport environments may become anonymous spaces of transit without local identity [26]. Urry and Larsen's tourist gaze and Richards and Wilson's discussion of creative tourist experience further suggest that mobility environments shape how people perceive and consume places [27,28]. Pine and Gilmore's experience economy and Richards's later work on creativity and tourism also help explain why mobility environments increasingly participate in the production of cultural and experiential value [33,34].

Architectural theory deepens this argument. Pallasmaa emphasizes the sensory and embodied dimensions of architectural experience [29]. Zumthor's discussion of atmosphere shows how material, light, temperature, sound, and spatial presence influence perception [30]. Frampton's theory of tectonic culture highlights the expressive potential of construction and structural articulation [31]. Pevsner's history of building types reminds us that buildings should be understood not only through style but also through function, social role, and typological development [32]. These perspectives allow station buildings to be examined as spatial media through which mobility, public life, and cultural meaning are produced.

This concept also helps distinguish deep cultural integration from superficial decoration. A station building may display local motifs, colors, or signs, but these features do not automatically produce cultural depth. Cultural meaning becomes more convincing when it is embedded in the organization of space. For instance, a restored historical roof can make industrial heritage visible through continued use. A station plaza can turn arrival into a civic ritual. A transparent concourse can reconnect separated districts. A rooftop garden can transform a transport building into an accessible public landscape.

2.4. Research Gap and Contribution

Existing studies have substantially advanced the understanding of railway stations as transport nodes, station-area development catalysts, heritage assets, and public spaces [1–10]. Meanwhile, place-based urban design theories have emphasized imageability, spatial experience, public life, and local identity [11–18,21–24]. Architectural theories of atmosphere, tectonics, and spatial experience further clarify how built form can communicate meaning beyond function [29–32].

However, these bodies of literature remain insufficiently connected at the architectural scale of the station building itself. In particular, the cultural and narrative capacity of railway station buildings has not been adequately theorized. Many studies discuss stations as nodes, places, development areas, or transport-oriented assets, but fewer examine how

architectural form, materiality, threshold, structural expression, adaptive reuse, landscape, and public-space design work together to transform a station into a cultural interface.

This study addresses this gap by proposing a Node–Place–Narrative framework and applying it to four contemporary railway station buildings across different geographical and design contexts. The framework does not replace existing node-place theory. Instead, it extends it by adding the narrative dimension, which is necessary for analyzing cultural meaning, symbolic expression, architectural memory, and experiential identity.

3. Materials and Methods

3.1. Research Design

This study adopts a qualitative multiple-case study design. Case study research is appropriate when the objective is to understand complex architectural, spatial, social, and cultural phenomena in real-life contexts [35–37]. In architectural research, case-based analysis is particularly useful for examining the interaction among built form, spatial organization, material expression, use, and meaning [38].

The empirical material consists of publicly available architectural and project information, transport-authority records, heritage documentation, architectural-practice descriptions, relevant scholarship, and comparative visual-spatial analysis. No primary human-subject or passenger-count data are analyzed; claims about users and performance are therefore limited to what can be supported by the documentary evidence.

3.2. Case Selection

The cases were selected purposively through maximum-variation sampling rather than statistical representativeness. Four criteria were applied: (1) each is a built and internationally recognized railway station; (2) each presents a distinct relationship between transport function, public space, and architectural identity; (3) each is documented by at least two relevant source types, such as an operator or heritage authority and an architectural or scholarly source; (4) together the cases vary in period, geographic context, urban condition, and dominant design mechanism. This logic supports analytical generalization across mechanisms, not claims of global representativeness.

The selected cases are St Pancras International in London, United Kingdom; Rotterdam Centraal in Rotterdam, the Netherlands; Liège-Guillemins Station in Liège, Belgium; and Hong Kong West Kowloon Station in Hong Kong, China (see Table 1).

Table 1. Case profiles and selection rationale.

Analytical Role and Selection Rationale	Principal Designer(s)	Completion/Reopening	Location	Case
Heritage reactivation: continued use links Victorian fabric with contemporary international mobility.	William H. Barlow; George Gilbert Scott; Foster & Partners (extension) [39,40]	1868 (train shed); 2007 i(international redevelopment)	London, United Kingdom	St Pancras International
Urban legibility: a transparent civic gateway links multimodal movement with contrasting urban districts.	Team CS: Benthem Crouwel Architects, MVSA, and West 8 [41,42]	2014	Rotterdam, The Netherlands	Rotterdam Centraal
Structural symbolism: expressive infrastructure combines platform organization, urban bridging, and civic image.	Santiago Calatrava [43,44]	2009	Liège, Belgium	Liège-Guillemins Station
Landscape-civic integration: underground high-speed rail is connected to daylight, roofscape, public space, and views.	Aedas [45]	2018	Hong Kong, China	Hong Kong West Kowloon Station

3.3. Analytical Framework: Node–Place–Narrative

The analysis is organized through a three-part framework (see Figure 1 and Table 2). The three components of this framework are as follows:

- Node refers to the station's infrastructural function. It includes transport connectivity, passenger movement, transfer logic, access points, and circulation clarity.
- Place refers to the station's performance as a public building and part of the urban fabric. It is evidenced by opportunities for public occupation, comfort, encounter, orientation, and pedestrian continuity, including plazas, concourses, waiting areas, daylight, seating, accessibility, commercial-public balance, and links to surrounding districts.
- Narrative refers to the meanings that architecture enables users or observers to associate with a station. It is evidenced through heritage continuity, symbolic form, material and structural expression, public art, landscape framing, view corridors, and the sequencing of arrival. Unlike Place, which concerns what the environment enables people to do and how it connects spatially, Narrative concerns how those features signify memory, identity, or collective meaning.

The dimensions are analytically distinct but may overlap in a single feature. For example, a transparent hall is coded as Place when it improves pedestrian continuity and orientation; it is coded as Narrative only when the evidence supports an interpretation of openness or metropolitan identity. Dual coding was permitted, but the rationale for each code was recorded separately. The Cultural Interface category is therefore an integration outcome, not a fourth independent dimension.

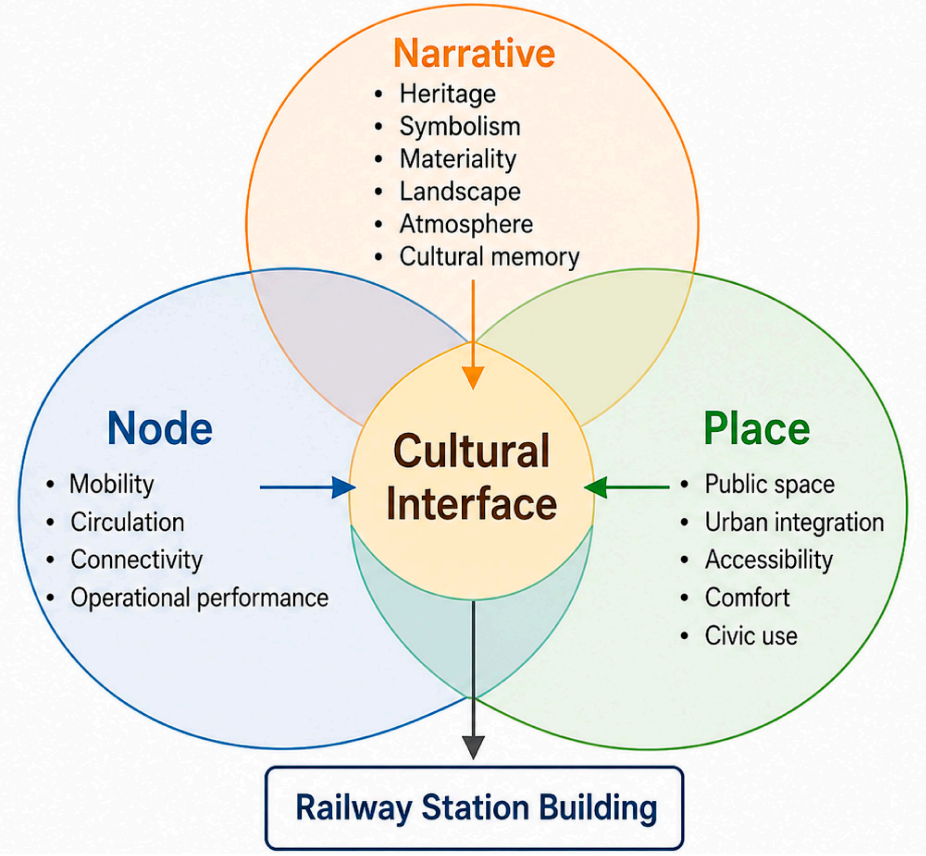


Figure 1. The Node–Place–Narrative framework for analyzing railway station buildings as cultural interfaces: A station becomes a cultural interface when node, place and narrative reinforce on another.

Table 2. Operational definitions, evidence indicators, and coding rules.

Dimension	Operational Boundary	Evidence Indicators	Coding Rule
Node	Movement, access, transfer, and infrastructural operation.	Services, platform and entrance organization, transfer paths, vertical circulation, wayfinding, and multimodal connectivity.	Code when the primary evidenced role is moving, processing, or orienting passengers within the transport system.
Place	Public use, comfort, and spatial connection to the city.	Concourse and plaza use, waiting, seating, accessibility, daylight, pedestrian continuity, public-commercial balance, and district links.	Code when a feature enables co-presence, non-mobility use, comfort, or urban continuity, regardless of symbolic meaning.
Narrative	Cultural meaning attributed to documented spatial features.	Heritage fabric, symbolic form, material or structural expression, public art, landscape framing, views, atmosphere, and arrival sequence.	Code only when the evidence supports an interpretation of memory, identity, symbolism, or experiential meaning; identify the claim as authorial interpretation.
Cultural Interface	Integration outcome rather than an independent dimension.	One feature or sequence demonstrably supports Node and/or Place performance while also carrying a substantiated Narrative.	Record the codes and rationales separately, then identify reinforcement, conflict, or a boundary condition across dimensions.

3.4. Analytical Procedure

The analysis followed five steps. First, a case dossier was compiled for each station from official operator material, heritage or award records, architectural practice documentation, and relevant scholarship. Second, source-supported observations were extracted at the building scale, including transport organization, thresholds, concourses, plazas, structure, materiality, daylight, landscape, and urban connections. Third, these observations were coded deductively against the definitions and decision rules in Table 2. Fourth, a within-case matrix linked each observation to its source, Node or Place code, and any Narrative interpretation. Fifth, the four matrices were compared to identify recurrent integration mechanisms, differences, boundary conditions, and tensions.

Reliability was strengthened through source triangulation and an explicit evidence-to-inference chain. Wherever possible, factual claims were checked against at least two source types. Published or official claims are cited directly, whereas interpretive classifications—such as "heritage-memory interface"—are presented as the authors' analytical synthesis. The procedure does not assign numerical scores because the available documents are heterogeneous and do not provide comparable performance or user-evaluation data. Instead, Table 3 makes the coding rationale and evidential limits visible for critical review.

Table 3. Evidence-to-inference matrix for the four cases.

Narrative Inference and Evidential Limit	Place Coding	Node Coding	Documented Evidence	Cases
Heritage-memory interface. Reuse makes railway history present, but user attachment and commercial-public balance are not measured.	Historic interior supports circulation, waiting, hospitality, art, and public encounter.	International, intercity, regional, and domestic interchange.	Grade I complex; restored train shed and undercroft; international reopening in 2007 [39,40].	St Pancras International

Table 3. *Cont.*

Narrative Inference and Evidential Limit	Place Coding	Node Coding	Documented Evidence	Cases
Urban-regeneration interface. Openness is interpreted as metropolitan identity; user readings are not directly tested.	Hall and forecourt connect passenger movement with the city and adjacent districts.	Legible coordination of rail, metro, tram, bus, bicycle, and walking.	Team CS station completed in 2014; transparent hall, differentiated urban fronts, and open forecourt [41,42].	Rotterdam Centraal
Structural-symbolic interface. Monumentality creates civic image, but comfort and everyday occupation require post-occupancy evidence.	Open section and transparent canopy support visual continuity with the city.	Platforms, bridges, access, parking, and services integrated through structure.	Calatrava station completed in 2009; large vault spans five platforms and links divided urban areas [43,44].	Liège-Guillemins Station
Landscape-civic interface. Skyline-oriented arrival is documented; inclusiveness and long-term use depend on access, climate, and management.	Daylight, roofscape, and connected ground plane return public space above infrastructure.	Below-grade cross-boundary processing and vertical circulation.	Aedas station completed in 2018; daylit atrium, roof routes, Green Plaza, and Sky Corridor [45,46].	Hong Kong West Kowloon Station

3.5. Data Sources and Ethical Considerations

The study uses publicly available data and published documentation. A source hierarchy was applied: heritage and transport-authority records were prioritized for dates, legal status, and operational facts; architectural practice records were used for design intent and project characteristics; scholarly sources provided theoretical interpretation and contextual critique. Visual-spatial reading was used only to interpret documented architectural features and is identified as authorial analysis rather than user evidence. Because the study involves no human participants, private data, or experimental intervention, institutional review board approval is not required.

4. Results: Comparative Case Analysis

4.1. Overview of the Case Analysis

The four cases maximize analytical variation rather than represent a single national or stylistic model. St Pancras International foregrounds heritage reactivation; Rotterdam Centraal foregrounds urban legibility; Liège-Guillemins Station foregrounds structural symbolism; and Hong Kong West Kowloon Station foregrounds landscape-civic integration. Table 3 summarizes the evidence-to-inference chain used to derive these classifications.

For each case, Node and Place findings are tied to documented spatial or operational features, while Narrative findings are framed as interpretations of how those features communicate identity, memory, or arrival. This distinction prevents symbolic claims from being treated as self-evident facts and allows the same feature to receive separate functional, public-space, and meaning-related readings.

The results are reported first as concise within-case analyses and then as a cross-case synthesis. Each case concludes with a qualification indicating what cannot be established from documentary evidence alone, particularly user attachment, comfort, and long-term public-space performance.

4.2. St Pancras International: Heritage Restoration as Cultural Continuity

St Pancras International is a Grade I historic complex whose train shed was constructed in 1865–1868 and whose international redevelopment opened in 2007; the platform

extension behind Barlow's restored shed was designed by Foster & Partners [39,40]. These source-supported facts establish the material and programmatic continuity on which the case interpretation is based.

As a Node, the station integrates international, intercity, regional, and domestic high-speed services. As a Place, the restored train shed and opened undercroft combine passenger circulation with retail, hospitality, art, waiting, meeting, and viewing. The continued public use of historic fabric therefore links operational renewal to an expanded urban interior rather than treating conservation as a separate display.

The Narrative classification is heritage reactivation: Victorian engineering, the Gothic Revival frontage, public art, and contemporary international travel are experienced as successive layers of railway history [47–52]. This is an authorial interpretation grounded in the preserved fabric and reuse strategy; the documentary evidence does not by itself demonstrate the strength of passengers' emotional attachment or evaluate crowding and commercial-public balance.

4.3. Rotterdam Centraal: Transparency, Urban Regeneration, and Metropolitan Identity

Rotterdam Centraal was designed by Team CS—Benthem Crouwel Architects, MVSA, and West 8—and completed in 2014 [41,42]. Project documentation emphasizes a transparent, accessible transport hub, a city-facing entrance, and deliberately different responses to the metropolitan center and the lower-scale Proveniers district.

As a Node, the station coordinates rail, metro, tram, bus, bicycle, and pedestrian movement through a legible hall and route structure. As a Place, the open concourse, station forecourt, transparent frontage, and differentiated urban edges create continuity between passenger movement and surrounding public space. Here, legibility is not merely wayfinding; it also makes the station readable as a civic threshold.

The Narrative classification is metropolitan openness. The directional roof, city-facing entrance, transparency, and contrast between the two urban fronts can be interpreted as expressing Rotterdam's contemporary civic identity. This meaning is inferred from documented design intent and spatial form rather than measured user perception. The case therefore supports a claim about how legibility can carry identity, not a claim that all users read the building in the same way.

4.4. Liège-Guillemins Station: Sculptural Infrastructure and Urban Bridging

Liège-Guillemins Station was designed by Santiago Calatrava and completed in 2009. Documentation describes a 200 m-wide terminal, an arched roof extending across five platforms, and a design intended to connect urban areas previously divided by the tracks [43,44].

As a Node, the station integrates high-speed rail, platforms, bridges, parking, vehicular access, and passenger services within one structural system. As a Place, the absence of a conventional façade, the open plaza level, and the visual continuity between platforms and city reduce the sense of a sealed transport container. Structure simultaneously organizes movement, shelter, views, and urban connection.

The Narrative classification is structural symbolism: repeated arches, long spans, light, and transparency turn engineering into the station's principal civic image. The comparison also exposes a tension. Monumental form can create recognition while offering limited evidence about human-scale comfort, everyday occupation, or maintenance. Those outcomes require observation or post-occupancy evaluation and are not assumed from iconic form alone.

4.5. Hong Kong West Kowloon Station: Landscape-Integrated Infrastructure and Civic Interface

Hong Kong West Kowloon Station, designed by Aedas and completed in 2018, is a cross-boundary high-speed rail terminus embedded in a dense urban context [45,46]. Official documentation identifies a large daylit curtain wall, a curved steel roof, tall structural columns, and approximately three hectares of external public space, including the Green Plaza and Sky Corridor [46].

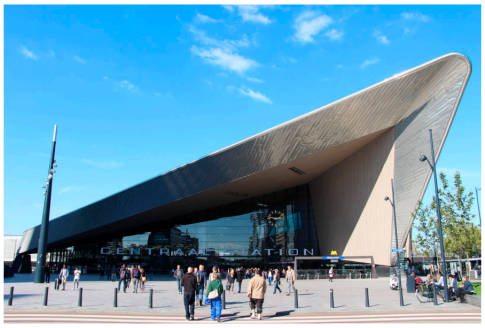
As a Node, the station concentrates passenger processing, large concourses, vertical circulation, and cross-boundary rail operations below grade. As a Place, daylight, long views, rooftop routes, and the connected ground plane counter the enclosure normally associated with underground infrastructure. The roof and surrounding landscape return walkable public space above a highly technical transport program.

The Narrative classification is landscape-civic integration. The bending ground plane, harbor-facing volume, skyline views, and movement over the roof recast arrival as an encounter with Hong Kong's topography and vertical urban image [45]. This interpretation is supported by documented design intent, but the actual inclusiveness, comfort, and social intensity of the open spaces depend on access, climate, management, and long-term observation beyond the present documentary study.

Figure 2 provides a comparative visual reference for the four mechanisms identified in the case analyses. The selected views foreground heritage continuity at St Pancras, the city-facing threshold at Rotterdam Centraal, structural expression at Liège-Guillemins, and the daylit atrium at West Kowloon. These images illustrate documented architectural characteristics rather than user perceptions or post-occupancy performance.



(**a**) St Pancras Heritage reactivation



(**b**) Rotterdam Centraal Urban legibility



(**c**) Liège-Guillemins Structural symbolism



(**d**) West Kowloon Land-scape-civic integration

Figure 2. Visual evidence for the four interface mechanisms: (**a**) heritage continuity at St Pancras; (**b**) the city-facing threshold at Rotterdam; (**c**) structural expression at Liège; and (**d**) the daylit atrium at West Kowloon. Photographs: (**a**,**b**) Fred Romero (CC BY 2.0); (**c**) Trougnouf (CC BY 4.0); and (**d**) Wpcpey (CC BY-SA 4.0). Reproduced from Wikimedia Commons [53–56]; images were resized without content alteration.

4.6. Cross-Case Findings

Table 4 reports pattern-level findings rather than repeating the four case descriptions. The comparison distinguishes what is common to all cases, what varies among them, and what each pattern implies for the proposed framework.

Table 4. Cross-case propositions, variations, and design implications.

Cross-Case Proposition	Convergent Evidence	Variation	Design Implication
Node is necessary but not differentiating.	All four cases organize complex rail movement and access.	Mobility is coupled respectively with heritage, urban legibility, structure, or landscape.	Verify operational clarity first, then examine how it enables or constrains public and cultural value.
Place concerns use and urban continuity.	Each case extends circulation into a public interior, forecourt, canopy, or roofscape.	The form and intensity of public occupation differ by context.	Assess comfort, access, co-presence, and district connection independently of visual distinction.
Narrative is an evidenced interpretation.	Meaning is tied to documented fabric, form, structure, views, or design intent.	The dominant narratives are memory, openness, civic structure, and landscape-oriented arrival.	State the evidence and interpretive rationale; do not treat symbolism as a self-evident performance result.
Integration produces the cultural interface.	The strongest features perform more than one role across the three dimensions.	Integration occurs through reuse, threshold clarity, tectonic expression, or sectional landscape.	Design for reinforcement across dimensions and identify conflicts rather than applying a fixed style.
Every mechanism has a boundary condition.	Documentary evidence does not establish user perception or long-term performance.	Risks include commercialization, exclusion, monumentality, and management-dependent public space.	Use interviews, observation, post-occupancy evaluation, and environmental data to test outcomes.

First, Node performance is a necessary enabling condition but not the main source of analytical differentiation. All four stations organize complex mobility; they differ in how circulation is coupled with heritage fabric, urban thresholds, expressive structure, or public landscape.

Second, Place and Narrative are related but non-interchangeable. Place is supported when a station enables public occupation, comfort, orientation, and urban continuity. Narrative arises when those spatial conditions are interpreted as heritage continuity, metropolitan openness, structural civic identity, or landscape-based arrival. A place can function effectively without a strong narrative, and an iconic narrative can remain socially weak if public use is poorly supported.

Third, the integration pathway differs by case. St Pancras links mobility to memory through reuse; Rotterdam links mobility to city comprehension through legibility; Liège links mobility to civic image through structure; and West Kowloon links subterranean mobility to public landscape through section, light, and roof access. The mechanisms are comparable without being reduced to one style or universal formal solution.

Finally, each mechanism has a corresponding risk: commercialization may weaken heritage-public balance; formal clarity may not guarantee social inclusiveness; monumentality may exceed human-scale needs; and landscaped infrastructure may underperform if access or management is weak. These tensions make the framework a critical comparative tool rather than a catalog of exemplary forms.

4.7. Summary of Results

The framework of Node–Place–Narrative helps clarify this transformation. The node dimension ensures operational performance and transport connectivity. The place dimension converts the station into a civic environment for waiting, meeting, orientation, and public use. The narrative dimension gives the building symbolic, historical, environmental, or cultural significance. When these dimensions reinforce one another, the station becomes more than a mobility facility. It becomes a public building capable of shaping how users experience the city.

5. Discussion

5.1. Extending the Node–Place Model Through Architectural Narrative

The findings support extending the node-place model at the scale of the station building, but they also qualify the extension. Narrative is not proposed as a third numerical value equivalent to accessibility or land-use intensity. It is an interpretive lens for tracing how documented spatial features carry memory, identity, symbolism, and experiential meaning.

The three dimensions therefore answer different questions. Node asks how movement is organized; Place asks how public life and urban continuity are supported; and Narrative asks what cultural meanings are enabled and on what evidence those interpretations rest. Treating them separately before examining their integration makes the analytical process more transparent and prevents architectural symbolism from substituting for operational or public-space performance.

The principal theoretical gain is an evidence-to-inference bridge between station-area research and architectural interpretation. Tables 2–4 show how observable features are coded, how meanings are inferred, and where documentary evidence is insufficient. This traceability is more important than presenting the framework as a fixed typology.

5.2. Cultural Interface Design: From Surface Representation to Spatial Integration

A central finding is that cultural meaning is most convincing when embedded in spatial organization rather than applied as surface representation. Decorative motifs can aid recognition, but they do not by themselves establish cultural depth. The stronger mechanisms in the four cases align meaning with continued use, urban orientation, structural order, or landscape experience.

The comparison also shows that spatial integration takes different forms. St Pancras makes memory available through active reuse; Rotterdam makes openness legible through its city-facing hall; Liège makes structure the medium of civic representation; and West Kowloon makes section and roofscape the medium of landscape-oriented arrival. Cultural interface design is therefore a relation between use, spatial form, and interpretation, not a recognizable visual style.

This argument has a boundary condition: documentary analysis can identify the architectural conditions that invite cultural interpretation, but it cannot confirm how consistently users perceive them. Claims about attachment, comfort, or social inclusion should be tested through interviews, observation, behavioral mapping, and post-occupancy evaluation.

5.3. Four Architectural Strategies for Cultural Interface Formation

The four strategies are best understood as mechanisms rather than fixed station types. Heritage reactivation works through continued use of significant fabric; urban legibility through readable thresholds and city connections; structural symbolism through

the integration of engineering and civic image; and landscape-civic integration through the return of light, views, and accessible ground or roof space to dense infrastructure.

Their transferability is therefore conditional. Heritage strategies require significant fabric and viable reuse; legibility requires coordination with surrounding routes and public space; structural expression must be matched by comfort and everyday usability; and landscape integration depends on climate, access, maintenance, and management. The cross-case contribution lies in these relations and boundary conditions, not in copying the formal appearance of any one station.

5.4. Balancing Infrastructure Performance and Human Experience

Station architecture must coordinate infrastructural, urban, and human scales. The cases show that the three scales cannot be judged independently: transport clarity enables public use, urban continuity supports orientation and access, and human-scale comfort determines whether symbolic or civic ambitions become usable experience.

The comparison also reveals asymmetrical risks. An efficient station can remain anonymous; an iconic station can be inconvenient; and a commercially active station can still provide weak public value. Design quality therefore depends on the mutual reinforcement—and explicit testing—of operational performance, public-space quality, and cultural meaning.

5.5. Implications for Future Station Building Design

The findings suggest five design implications: develop passenger flow together with public-space and urban-connection strategies; treat arrival thresholds as civic spaces; embed cultural identity in spatial sequence, material, structure, landscape, and adaptive reuse rather than decoration alone; evaluate light, shelter, ventilation, acoustics, and walking comfort as part of cultural experience; and test iconic gestures against accessibility, daily use, maintenance, and management.

Operationally, these implications can be used as a design-review sequence rather than a stylistic checklist. Teams can first verify Node requirements, then assess Place performance, then articulate and substantiate the intended Narrative, and finally examine where one architectural decision reinforces or undermines the other dimensions. This sequence is applicable to new high-speed rail stations, airport-rail interchanges, regeneration hubs, and the adaptive reuse of historic terminals.

5.6. Theoretical and Practical Contributions

The study makes two theoretical contributions. It extends node-place research from the station-area scale to the architectural scale by adding a transparent interpretive account of narrative, and it defines the cultural interface as an integration outcome produced when mobility, public-space performance, and meaning reinforce one another. The distinction between evidence, coding, and interpretation is central to both contributions.

The practical contribution is a transferable but non-prescriptive analytical sequence and four conditional design mechanisms. Architects can use the framework to connect circulation decisions with public life and cultural intent; planners can use it to assess the station building as a civic asset; and researchers can use it to formulate user-based or performance-based tests. The framework is not presented as a universal score or substitute for technical evaluation.

5.7. Limitations and Future Research

This study has several limitations. First, it is based on qualitative case analysis rather than quantitative user research. Although the selected cases are supported by verifiable public sources and architectural documentation, the study does not include

passenger interviews, behavioral mapping, or post-occupancy evaluation. Future research could examine how different user groups perceive the cultural and spatial qualities of station buildings.

Second, the study focuses on four internationally recognized cases. These cases provide strong analytical value, but they cannot represent all types of railway station buildings. Future studies may include ordinary commuter stations, small rural stations, newly built high-speed rail stations, or stations in rapidly urbanizing regions.

Third, the study emphasizes architectural and cultural analysis rather than technical performance. Issues such as energy consumption, carbon impact, maintenance cost, acoustic comfort, crowd simulation, and long-term management deserve further investigation. A more comprehensive evaluation model could combine architectural design analysis with environmental performance and user-centered data.

Fourth, the concept of narrative requires further methodological refinement. In this paper, narrative is analyzed through heritage, symbolism, spatial sequence, materiality, landscape, and public experience. Future studies could develop more precise indicators for measuring architectural narrative and cultural interface quality.

Despite these limitations, the study provides a useful conceptual and methodological foundation for understanding contemporary railway station buildings as cultural interfaces. It argues that the future of station architecture should not be limited to greater speed, larger scale, or higher commercial density. Instead, the station should be understood as a public building where mobility, urban life, and cultural meaning are brought together.

6. Conclusions

This study developed and applied a Node–Place–Narrative framework to explain how contemporary railway station buildings can operate as cultural interfaces. A triangulated, deductively coded comparison of St Pancras International, Rotterdam Centraal, Liège-Guillemins Station, and Hong Kong West Kowloon Station linked documented architectural features to transport, public-space, and meaning-related interpretations.

The answer to the first two research questions is that cultural significance does not arise from decoration or iconic form alone. It emerges when Node performance enables public occupation, Place strategies connect the station to urban life, and Narrative strategies make heritage, openness, structure, or landscape experientially legible. The four cases demonstrate different integration pathways rather than a single stylistic model.

In response to the third research question, the framework contributes a building-scale extension of node-place theory and an explicit distinction between observable place performance and interpretive narrative claims. The four mechanisms—heritage reactivation, urban legibility, structural symbolism, and landscape-civic integration—offer a practical vocabulary for design reflection when their contextual conditions and risks are also considered.

The conclusions remain bounded by the evidence. Documentary analysis cannot establish user attachment, comfort, inclusiveness, or long-term operational and environmental performance. Future work should test the framework through interviews, observation, behavioral mapping, post-occupancy evaluation, and environmental data, and should include ordinary commuter and rural stations. Within these limits, the framework shows how station design can connect mobility with public value and culturally meaningful experience.

Author Contributions: Conceptualization, Y.B. and Y.S.; methodology, Y.S.; investigation, Y.B.; writing—original draft preparation, Y.B.; writing—review and editing, Y.S. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: No new datasets were created. The study is based on publicly available architectural documents, heritage records, official project descriptions, and published literature cited in the article. The source-to-code logic is summarized in Tables 2–4, and the authors' analytical materials are available from the corresponding author upon reasonable request.

Acknowledgments: The authors acknowledge the publicly available architectural archives, heritage records, project documentation, and academic research that supported this comparative study.

Conflicts of Interest: The authors declare no conflicts of interest.

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