# ON THE MOVE

Reimagining Milan's Central Station as cultural hub

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"in motu vita"

# THE ASSIGMENT

This thesis and its research are part of a broader investigation led by the Chair of Complex Projects and its collaborators.

#### CP: BUILDING & BODIES 2024 - 2025

The Bodies & Building studio guides students in developing their final designs by analysing a **geographical context**, **building typology**, a **specific lens**, and a **personal fascination**. This thoughtful integration informs both thematic exploration and the final design outcomes.

For the 2024 Graduation Studio: Building & Bodies, a group of 24 students and 16 professors will explore the following topics:

#### 01 Geographical Context

This year, students are invited to investigate Milan, a city recognized for its legacy as Italy's economic and industrial powerhouse.

#### 02 Building Typology

The research focuses on nine building typologies categorized into **space**, **area**, and **flows**. Each group emphasizes its unique spatial features:

- Space: Museum, Courthouse, Opera
- Area: Library, University

- Flow: Airport, Train Station, Hospital Each student selects one building typology; for this thesis, the focus is on the **Train Station**.

#### 03 Targeted Lens

In addition to a building typology, a collective theme is provided by professors, enabling students to engage in group research that evolves into both individual and collaborative strategies. Together, these form a cityscale approach that each student applies individually.

In this case, the lens for group 2, guided by Benjamin Groothuijse and Maria Finagina is **Culture**.

#### 04 Personal Fascination

Rapid changes have inspired my research in transportation and mobility in the field. Initially sparked by a fascination with future mobility types and their design implications, this interest has since evolved to focus on the role of train stations within Milan's cultural context.

This thesis will examine the changing role of train stations in Milan, emphasizing programmatic layout, flow efficiency, and the station's relationship to the expanding city.



Figure 1: Visual Representation of the Building and Bodies 2024 Graduation Studio





#### THESIS TOPIC

This thesis explores the redesign of Milan's Central Station as a flexible, responsive, and scalable urban hub that integrates transportation with cultural experiences.

Titled "On the Move," the project aligns with the European Union's 2050 agenda for sustainable urban development and efficient mobility. It proposes a shift from viewing train stations as mere transit nodes to envisioning them as vibrant cultural centers that actively contribute to the city's dynamic identity.

Drawing inspiration from Milanese Futurism and the concept of "In Motu Vita" (Life is in Motion), the research investigates how architectural design can balance transportational efficiency and cultural dynamism.

By utilizing Milan's historical trams as "living spaces" for cultural events, the project introduces a "Experience Depot" concept that allows culture to be continuously present throughout the city.

The year-long thesis not only challenges the traditional typology of train stations but also sets a visionary precedent for integrating cultural vitality into urban mobility hubs. Through a thoughtful spatial integration of Milanese culture, the redesigned station will adapt to the city's evolving needs, ensuring it remains a lively and contemporary landmark for generations to come.



# **PROBLEM STATEMENT**

#### The need for a new approach:

Since their inception in the 19th century, train stations have consistently reflected the technological advancements and cultural aspirations of their respective eras. These grand edifices, often monumental in scale and design, became symbols of progress and national pride. As Europe's nationstates emerged, train stations transcended their functional roles, embodying modernity and offering architects a unique platform to express cultural narratives and aesthetic ideals. They slowly became more than transitional spaces, standing as enduring testaments to architectural and engineering innovation while striving to meet the evolvina needs of modern travelers.

Milan's Central Station, designed by Ulisse Stacchini and inaugurated in 1931, is a prime example of this evolution. Initially constructed to address infrastructural inadequacies, the station quickly became an iconic symbol of movement and modernity, embodying the spirit of "In Motu Vita" (Life is in Motion).

As urban demands evolved, Milan's Central Station underwent several renovations to improve functionality and adapt to changing needs. These updates included enhancing accessibility, expanding transport connections, modernizing infrastructure, and introducing commercial spaces, ensuring the station remained a vital part of the city's mobility network.

Despite these efforts, a pivotal question remains:

Have these changes been sufficient to maintain the relevance of train stations in today's changing urban landscape?

Many renovations, including those at Milan's Central Station, have primarily focused on functionality and commercial potential rather than cultural integration or adaptability to future urban needs. The station's history of reactive changes, rather than proactive evolution, underscores the need for a new approach to train station design: one that embraces adaptability, resposiveness and integrates cultural functions.

This thesis, titled "On the Move," proposes a visionary transformation of Milan's Central Station into a dynamic hub.

The project aims to shift the station's role from a static architectural icon to a dynamic urban hub that not only enhances mobility but also enriches Milan's cultural fabric.

By repurposing Milan's historical trams as "living spaces" for cultural events, the project introduces a continuous cultural experience throughout the city. This forwardthinking approach envisions a train station that evolves with the city's changing needs, ensuring it remains a resilient, adaptive, andlandmark for generations to come.

# "<u>Built to last,</u> not to evolve"

# **RESEARCH QUESTION**

To address the challenges posed by the evolving urban landscape and the need for train stations to adapt as multifunctional hubs, this research focuses on a set of critical questions aimed at exploring the transformation of traditional train station typologies. The main research question guiding this design investigation is:

# How can Milan's Central Station be into a flexible, responsive, scalable and scalable hub that addresses the evolving cultural demands?

#### **SUB QUESTIONS**

This question is complemented by several sub-questions that focus into specific aspects of this transformation. These include:

- "How can the layout of a train station transform from a rigid model to a versatile organisation that effectively accommodates both existing and emerging modes of transportation?"
- "How can the design of a train station respond to fluctuations generated by daily routine commutes and weekly cultural events while maintaining passenger and visitor flow efficiency?
- "How can design principles be utilized to enhance the scalability of the train stations in response to Milan's increasing cultural, societal and transportation demand?"
- » "How can cultural activities such as temporary venues and exhibitions impact the operational organisation of the train station?"

Together, these questions provide a comprehensive framework for reimagining train stations as vital components of urban infrastructure that foster community engagement and adapt to the complexities of contemporary Milanese urban and cultural life.





# **RESEARCH FRAMEWORK**

The upcoming chapter will contextualize the main research question within the framework of current academic literature and studies to develop a theoretical foundation. It will also highlight the relevance of this research by discussing existing theories and concluding with its significance.

# TRAIN STATIONS AS CIVIC MIRRORS

Milan Centrale's Legacy and Limitations Throughout history, train stations have served as potent symbols of progress and national identity, reflecting the technological advancements and cultural values of their respective eras. In the early days of rail travel, these facilities were little more than utilitarian sheds—basic structures that merely provided shelter for steam locomotives and their passengers.

However, as railways became the lifeblood of industrializing nations, stations evolved into monumental landmarks, embodying engineering prowess, political power, and architectural ambition.

Milan's Central Station stands as a example of this transformation. Inaugurated in 1931 and designed by the architect Ulisse Stacchini, the building was conceived as a lasting emblem of modern Italy—both technologically advanced and imperially grand. Commissioned under the fascist regime, its monumental scale and eclectic decorative language—blending Liberty, Art Deco, and neo-Assyrian motifs were deliberately meant to impress and to project national confidence.

Stacchini himself envisioned the station as an "urban gateway" that would stand the test of time, both structurally and symbolically.

Yet, despite its architectural grandeur and centrality in Italy's transport network, Milan Centrale has struggled to keep pace with the demands of contemporary urban life. Over the decades, changes to the station have tended to be reactive rather than visionary limited to isolated renovations rather than comprehensive planning.

While restorations in the early 2000s improved some structural and aesthetic elements, they did not fundamentally reconfigure the station's ability to meet modern expectations. As a result, Milan Centrale today finds itself constrained—visually iconic but functionally rigid—at a time when transportation systems and urban life are evolving rapidly in complexity and scale.





# FROM GATE TO HUB

In its current state, Milan's Central Station sits at the convergence of multiple and often competing demands—each of which reflects the city's dynamic evolution.

#### 1. Mobility Challenges

Originally built for the orderly flow of trains and passengers, the station now faces the much more complex task of coordinating a vast array of mobility systems. High-speed trains, regional rail services, underground metro lines, trams, taxis, bicycles, ridesharing vehicles, e-scooters, and, soon, autonomous vehicles all need to be integrated within and around the station's footprint. This multiplicity of modes brings new spatial and logistical requirements, from designated drop-off points and charging stations to flexible infrastructure capable of adapting to emerging technologies. The rigidity of the original layout, focused almost exclusively on train traffic, makes integration increasingly difficult. such

#### 2. Cultural and Social Demands

Milan is not only a transport hub but also a global cultural capital. The city hosts more than 200 major events each year—ranging from fashion and design fairs to literature festivals and international conferences. Events like Salone del Mobile or Milan Fashion Week lead to massive, temporary surges in the station's use, both by visitors and logistical operations. However, the current station layout lacks the flexibility and spatial diversity needed to support these short-term but highintensity demands. Public areas remain largely dedicated to transit and retail, with limited space for cultural programming, exhibitions, or spontaneous gatherings. This creates a disconnect between the station's potential as a civic forum and its current functionality.

Together, these pressures call for a radical rethinking of what a central station can and should be in the 21st century. The challenge is not merely to restore or expand existing facilities but to redefine Milan Centrale as a multifunctional urban hub—a place that supports diverse flows of people, information, and culture with flexibility and resilience.

This leads directly to the central inquiry guiding this thesis:

How can Milan's Central Station be transformed from a traditionally rigid and mono-functional transport facility into a flexible, responsive, and scalable urban infrastructure that reflects and supports Milan's evolving cultural and mobility demands?

# **INTEGRATING LAYERS OF MOBILITY**



The typological evolution of train stations over time mirrors the growing complexity of urban mobility systems. Originally designed as single-function infrastructures catering solely to rail transit—either as terminus or side stations—station typologies have gradually adapted to accommodate an expanding range of transportation modes.

The diagrams trace this shift, illustrating how traditional configurations like the end

station or side station have evolved into more complex hybrids: stations flanked by platforms on both sides, stations elevated above ground-level tracks, and those integrating underground tunnels. These layouts respond to spatial constraints and operational needs, but also to the imperative of accessibility and multi-directional flow.

Simultaneously, the vertical section diagrams demonstrate how stations are increasingly



TRACKS AT GROUND LEVEL

06. STATION ON TOP + UNDERGROUND TRACKS

layered, with public functions and circulation routes stacked above or below the tracks.

This reflects a broader transformation of the station from a mere stopover into a spatial node embedded within a multi-modal transport network. The accompanying timeline reinforces this by showing the increasing number of transport types—steam locomotives, trams, subways, bicycles, buses, trucks, electric vehicles, hybrid and autonomous cars—that now intersect at or near train stations. As the diagram illustrates, the modern station must act as a connective tissue, integrating more than ten distinct transportation systems and enabling seamless inter-modality across scales and speeds.

This evolution is not just technical but spatial, demanding greater architectural flexibility and urban integration.

# INTEGRATING LAYERS OF MOBILITY



Complementing this chronological evolution is a comparative breakdown of six fundamental station typologies, each representing a spatial response to increasing mobility complexity.

The diagrams you developed visualize how urban rail infrastructures have evolved not only horizontally in terms of track layout (e.g., side vs. central access) but also vertically introducing bridges, tunnels, and stacked functions to optimize land use and user flow.

The most basic typologies, such as the end station and side station, offer limited access and interaction between modes, often creating bottlenecks and pedestrian barriers. More advanced configurations, such as both-sides with bridge or tunnel solutions, enable cross-platform movement and better distribute flows. The final two types—stationon-top with ground-level tracks and station-



on-top with underground tracks—represent a paradigm shift: the station becomes an elevated or buried civic structure capable of integrating multiple layers of mobility, from cars and buses to metro lines, shared micromobility, and pedestrian circulation.

These typologies demonstrate how architectural sectionality and spatial layering are increasingly leveraged to accommodate growing demand for accessibility, efficiency, and multimodal connection.

They highligh that the modern station is not merely a transit point but a highly choreographed urban node requiring both infrastructural clarity and architectural flexibility.

# AN EVOLVING URBAN ROLE

Historically, train stations functioned as monumental gateways to cities—points of arrival and departure that concentrated movement and projected civic identity. As urbanization accelerated and transportation technologies evolved—from steam engines to electric trains, high-speed rail, and now micromobility—the function of stations began to shift. No longer limited to singlemode rail terminals, they are increasingly expected to act as multi-modal interchanges, integrating diverse forms of movement and anchoring vibrant urban districts.

The **Node-Place model**, developed by Luca Bertoliniin 1996, offers a conceptual framework to understand this duality. In this model:

The "**node**" refers to a station's role within wider transportation networks—its capacity to link local, regional, and national systems efficiently.

The "**place**" aspect emphasizes the station's role within the urban fabric—as a destination, a meeting point, a space for commercial, social, and cultural activity.

Milan Centrale, historically, has prioritized its node function—emphasizing rail capacity and monumental architectural scale over localized urban integration. Commercial additions like shopsandcafeshaveincrementallyintroduced place elements, but these remain secondary in spatial hierarchy and design intent.

The rapid rise of new mobility patterns shared micro-vehicles, app-based transport, and smart infrastructure—demands a far more adaptive station typology. Rather than merely adding services, a holistic shift is needed to reimagine the station as a civic ecosystem: one that facilitates smooth transitions between modes while enriching the social and cultural life of the city.

# FROM ONE TO MANY







# AN AVANT-GARDE VISION

Milan As continues its transformation into a dynamic, globally connected urban center, its central station must evolve from a single-purpose transit facility into a rich, civic ecosystem. Increasingly, the station is expected to act as a cultural and social venue, hosting events, exhibitions, and informal encounters that reflect the citv's identity. However, these expectations remain difficult to meet within the constraints of historically rigid architectural models. Most traditional station layouts are ill-equipped to accommodate unpredictable visitor flows, pop-up programming, or new types of civic use.

Moreover, the very nature of mobility is shifting. Alongside trains and subways, stations must now integrate e-scooters, bikesharing, car-pooling, and app-based logistics. These forms of mobility are lightweight, decentralized, and fast-changing—placing entirely new demands on public space, digital infrastructure, and station governance.

In response, the future mobility hub must reject static design. Instead, it must be conceived as a flexible, modular, and futureenvironment—capable readv of auick upgrades and spatial reconfiguration. As noted in ARUP's Mobility Hubs of the Future (2020), the ability to plan for the unknownto anticipate infrastructure that does not yet exist—is crucial. Designing for value over time becomes a key strategy: rather than fixating on immediate function, architects and planners must prioritize adaptability, lifecycle resilience, and continuous usability.

This design approach means building stations that accommodate change from the start. Modular structures, flexible

public spaces, smart digital layers, and reversible materials ensure that the building's lifespan is extended and its social value is sustained. Unlike past models, which became obsolete when technologies or flows changed, the future station is incrementally upgradeable. It thrives by evolving.

In this vision, the future train station evokes the spirit of La città che sale (The City Rises, 1910–1911) by Umberto Boccioni. A seminal work of Italian Futurism, the painting captures the energetic transformation of the modern city—where human figures, horses, buildings, and scaffolding are interwoven in a swirling choreography of movement, construction, and force. Rather than depicting a finished urban form, Boccioni renders a city in flux—a space defined by simultaneity, where physical labor, infrastructure, and human aspiration coexist and overlap in real time. His concept of dynamism-the portrayal of motion, energy, and multiplicity within a single frame perfectly mirrors what the contemporary mobility hub must become. Like Boccioni's Futurist metropolis, the 21st-century train station is not static or monumental but alive, fluid, and in perpetual negotiation between modes, rhythms, and publics.

Thus, the station is no longer merely a point of transit. It becomes a living urban machine, operating 24 hours a day, responding to the pulse of the city, and blurring boundaries between infrastructure and culture, service and space, permanence and change.

Umberto Boccioni "La città che sale" (oil on canvas, 1910-15

NA.

# **EUROPEAN RELEVANCE**

The transition to greener mobility is a central pillar of the European Union's climate strategy, reflecting both environmental urgency and socio-economic ambition. In alignment with the **European Green Deal**, the EU has committed to reducing greenhouse gas emissions from transport by 90% by 2050. This ambitious target addresses the fact that transport alone is responsible for nearly a quarter of Europe's total emissions, with road transport making up a dominant 71%, followed by aviation at 14.4% and maritime transport at 13.5%.

In contrast, rail—one of the most energyefficient modes—accounts for just 0.5%, underscoring its potential role in achieving a more sustainable and low-carbon future.

The EU's roadmap toward this 90% reduction is structured around a combination of shortterm and long-term measures. By 2030, the goal is to double the use of high-speed rail across Europe, significantly reduce shorthaul flights under 2.5 hours by offering competitive rail alternatives, and ensure widespread access to new, sustainable modes of transport. In parallel, the creation of at least 100 carbon-neutral cities by 2030 will act as testbeds for integrated and inclusive mobility systems. These initiatives aim not only to reduce emissions but also to make alternative transport choices more appealing, accessible, and affordable for all Europeans.

At the heart of this strategy is the expansion and modernization of rail lines and the integration of various mobility solutions, designed to reduce dependence on fossil fuels and reinforce the resilience of the transportation system. The focus is not only on carbon reduction, but on rethinking mobility as a public good—one that supports territorial cohesion, economic competitiveness, and social inclusion.

The diagrams clearly visualize this systemic approach, linking each intervention to concrete climate and infrastructure goals. In this context, the relevance of the topic extends beyond environmental concerns: it speaks to a broader European vision of connectivity, sustainability, and equity across regions and generations.



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# A TIMELINE FOR SUSTAINABLE TRANSPORT



The diagram illustrates the EU's multi-pronged strategy for decarbonizing its transportation sector, presenting a clear yet dynamic vision for sustainable mobility.

On one side, the focus is on reducing reliance on high-emission modes: by 2030, the aim is to curb all short-haul flights under 2.5 hours—encouraging travelers to choose faster and cleaner rail options instead—and to establish at least 100 carbon-neutral cities across Europe. These initiatives are designed to significantly curb emissions, drive supply toward low-carbon systems, and scale up sustainable infrastructure.

On the other side, the EU is actively expanding alternatives: it seeks to double high-speed rail traffic, ensuring its reach and efficiency span transit across the continent. At the same time, the strategy promotes widespread availability of clean options like electric buses, micromobility services, and active travel—and integrates them into everyday transport options.

This dual-track approach not only aims to reduce greenhouse gases from transport which, after all, make up nearly a quarter of Europe's emissions—but also enhances equity, regional connectivity, and resilience, transforming mobility from a private concern into a shared, publicly owned ecosystem that delivers both environmental and societal benefits.



A key milestone in this transformation is the EU's commitment to doubling high-speed rail traffic by 2030—a target that serves as both a technical objective and a symbol of broader systemic change.

The diagram outlines the roadmap to achieving this, starting with short-term goals such as the expansion and modernization of existing rail lines. Upgrading infrastructure is not only about speed, but also about increasing capacity, improving energy efficiency, and reducing regional disparities in access.

Midway through the timeline, the focus shifts to integration: creating seamless multimodal systems that link high-speed rail with urban and regional mobility networks—metro lines, shared mobility, active travel, and digital ticketing platforms. By 2030, the aim is for high-speed rail to become a backbone of European transport, offering a competitive, sustainable alternative to short-haul flights and car dependency.

Long-term, this infrastructure will underpin the broader 2050 vision of accessible, low-emission mobility for all. The timeline doesn't just mark deadlines—it reflects a phased approach that balances immediate infrastructure needs with long-term social and environmental transformation.

#### IN THE NEWS:





#### IL POST:

Perché in Lombardia i treni quasi sempre in ritardo È il risultato di un conflitto di interessi tra la Regione e l'az Trenord, di una gestione poco organica e scelte sbagliate



₫ condres 🛛



#### **CORRIERE DELLA SERA:**

Il record del 9304, il treno Frecciarossa che viaggia sempre in ritardo

di lacopo Gor

Nei giorni feriali dei mese di ottobre 2024 questo treno che collega Napoli Centrale a Torino Porta Nuova ha sempre portato ritardo: da un minimo di 15 minuti a un massimo di 200 (con cancellazione)



Come chiedere il rimborso se il treno è in ritardo per lo sciopero del 5 novembre: la videoscheda Sciopero di 8 ore dalle 9 ale 17 per l'accoltelario

#### L'ARENA:

/// CIRCOLAZIONE SOSPESA ALL'ALBA

#### Guasto sulla linea Milano-Venezia, in ritardo e disagi a Porta Nuova

#### Redazione Web

Il guasto all'altezza di Peschiera. Dalle 8.15 la circolazione è in graduale ripresa, nel frattempo i convogli hanno accumulato ritardi fino a 100 minuti

16 ottobre 2024





**(f)** 

### un arronamento al limite della disumanità»: lo scrive un amasco che manda la foto scattata luneci mattina. 4 giunge: «Ho provato a mandare un reclamo, ma il servizio nor

© f X in □ @



«Sui treni un affollamento

E non funziona il servizio reclami» nto al límite della dis

disumano

Disagi anche alla stazione di Porta Nuova per intervnti di manutenzione sulla Milano-Venezia

# NATIONAL RELEVANCE

While the European framework sets a longterm vision for sustainable and integrated transport, Italy's current situation highlights the urgent need for systemic improvement.

The country's rail network, particularly in northern regions like Lombardy, is often plagued by inefficiencies, delays, overcrowding, and service disruptions—as regularly reported in national and regional news.

Headlines from outlets such as Milano Today, II Post, and Corriere della Sera point to chronic issues: from high-speed trains like the Frecciarossa 9304 frequently running late, to technical failures on the Milan-Venice line causing delays of up to 100 minutes. Even local services face persistent challenges, with poor coordination, aging infrastructure, and a lack of reliable communication with passengers.

These recurring breakdowns and delays undermine public trust in the railway system and highlight the critical need to rethink the role and design of central hubs like Milano Centrale. Rather than simply expanding capacity, there is a pressing need to enhance resilience, ensure operational fluidity, and accommodate multimodal solutions that can absorb surges, prevent bottlenecks, and guarantee a more equitable and efficient travel experience across the country.

# **URBAN RELEVANCE**

At the metropolitan scale, the urgency for a reimagined and resilient mobility system in Milan becomes even more evident. While the national rail network continues to suffer from delays and inefficiencies, data shows a steadily rising demand for reliable and integrated transport within the city. Public transportation usage in Milan has bounced back strongly from the COVID-19 disruption, with passenger volumes approaching prepandemic levels and expected to surpass 700 million rides in 2024.

At the same time, the city is experiencing consistent demographic growth, with the population projected to rise from approximately 1.39 million in 2020 to over 1.5 million by 2040. Parallel to this, tourism has made a full recovery, with annual visitors increasing sharply from just over 2 million in 2021 to more than 8.5 million in 2023 surpassing even pre-COVID highs. These intersecting pressures—growing resident needs, surging tourism, and intensified transit usage—place enormous strain on an already fragile infrastructure. In this context, relying on outdated rail systems and fragmented mobility planning is no longer viable. The data underscores a clear mandate:

Milan must move swiftly toward a systemic transformation of its mobility hubs, embracing adaptability, integration, and capacity expansion to serve a city that is not only growing, but evolving in complexity and pace.

# 800 million 600 million 400 million 200 million 200 million 201 million 201 million

#### Passenger volume on public transportation in Milan



#### Prevision of population growth in Milan

#### Amount of visitors per year in Milan



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