Graduation Plan

Master of Science Architecture, Urbanism & Building Sciences

Graduation Plan: All tracks

Submit your Graduation Plan to the Board of Examiners (Examencommissie-BK@tudelft.nl), Mentors and Delegate of the Board of Examiners one week before P2 at the latest.

The graduation plan consists of at least the following data/segments:

Personal information	
Name	Qianchen Yan
Student number	6029957

Studio		
Name / Theme	Complex Projects Graduation Studio- Bodies & Building Milan	
Main mentor	Olindo Caso	Architecture
Second mentor	Jan van de Voort	Architecture
Argumentation of choice of the studio	Last semester, I participated in the Inhabitation Data Studio, a former branch of the Complex Studio. That experience introduced me to a clear and logical workflow for developing and realizing designs, leaving a lasting impression. While I gained valuable insights into design thinking and problem-solving, the three-month duration felt too brief to fully explore these concepts. Joining the Complex Studio provides a broader platform for research and creativity. This will allow me to further improve my ability to address complex projects and challenges using structured logic and research methods.	

Graduation project	
Title of the graduation project	Milan Central Railway Station: The Gateway to Smarter Shared Mobility
Goal	
Location:	Milan Central Railway Station
The posed problem,	Milan handles over 5 million trips daily, but its public transportation system, including the central railway station, faces challenges such as outdated facilities, frequent delays, cancellations, and peak-hour congestion. These issues have pushed many residents to rely on private vehicles, making Milan the city with the third-highest car ownership rate in Europe. To address this, the government aims to embrace smart shared mobility to reduce private car usage. As key transportation hubs, railway stations play a vital role in organizing and coordinating traffic to improve travel efficiency. My research question, therefore, focuses on how to transform Milan Central Station to better support the development of smart shared mobility in the future.
research questions and	How can Milan Central Railway Station evolve into a transportation hub, better support the development of smart shared mobilities in the future?

design assignment in which these result.	As shown below

Design Assignment:
Milan Central Station is envisioned as a highly efficient, integrated, and smart multimodal shared mobility hub. This transformation is approached from four key perspectives:

1. Flow Optimization: Leveraging advanced smart technologies such as the MaaS platform (Users) and real-time data systems (Staff), the station can seamlessly connect various shared mobility options. This integration aims to optimize transfer efficiency and minimize walking distances for travelers.
2. Functional Design: As a cultural and economic center, Milan Central Station will include spaces for event organization, vibrant commercial areas for revenue generation, and interactive zones for smart mobility experiences. Additionally, a centralized smart traffic control center will enhance operational efficiency and user interaction.
3. Structural Adaptability: The station will employ modular and prefabricated structures, ensuring it can adapt to changes in passenger volume over time and remain scalable for future needs.
4. Architectural Form: The façade will incorporate iconic materials and elements from the historic station to preserve its status as a monument in the hearts of Milan's residents. Internally, the design will prioritize spatial experience and place-making, offering travelers a rich and memorable journey within the station.

Process

Method description

1. Client:

(1) Interviews: I conducted interviews targeting three key user groups: travelers, commuters, and city dwellers. Each group provided insights into their primary needs and perceptions of the station. For example, travelers prioritize the station's first impression as a symbol of Milan, emphasizing its role as a smart, shared mobility hub that reflects the city's identity. Commuters focus on time efficiency and seamless connections to reduce waiting times, while city dwellers value the station's integration into daily activities, seeking services that enhance urban living.

(2) Government Documents Review: I analyzed official documents to understand the station's operations and the organizational structure of Milan's traffic management. This included researching the roles and spatial needs of key stakeholders such as: Digital Apartment (smart system management); Station Management; Mobility Operators; Vendors

2. Program:

(1) Data Analysis: I analyzed passenger flow data at Milan Central Station to estimate the required capacity for shared mobility facilities, such as the number of shared bikes or cars needed to meet demand efficiently.

(2) Case Studies: I studied other major European terminus stations of similar scale to benchmark their spatial layouts, functional zoning, and user circulation. This provided a comparative reference for designing Milan Central Station.

(3) Literature Review: I reviewed studies on shared mobility systems to understand their operational models, spatial requirements, and modular design parameters. This informed the functional and flexible design of mobility facilities.

3. Site:

(1) Mapping: I conducted a multi-scale mapping analysis- XXL Scale: The station's role within Italy and the international transportation network. XL Scale: Its connectivity within the Lombardy region. L Scale: Its potential as a gateway transportation hub for Milan, focusing on its interaction with local transportation systems.

(2) Field Trip: I analyzed the architectural layout and functional distribution around the station, studying the pedestrian perspective and walking trajectories. I also observed the circulation of various transportation modes around the station to prepare for the core design phase.

Literature and general practical references

1. **Literature and Theories:**
   (1) I will review academic studies and reports on smart shared mobility systems, including their spatial and operational requirements.
   (2) Research on multimodal transportation hubs will provide insights into effective integration strategies and user experience design.
   (3) Theories on modularity and adaptive architecture will guide the structural flexibility required for future scalability.
   (4) Urban design literature focusing on placemaking and the role of transportation hubs as civic spaces will help enhance the station's cultural and social significance.
2. **Research Data:**
   (1) Data on passenger flows at Milan Central Station will be analyzed to determine capacity needs for shared mobility facilities.
   (2) I will examine government documents and policy frameworks related to Milan's mobility and transportation management to align my proposal with local objectives.
3. **Practical Experience/Precedents:**
   (1) Case studies of comparable European terminus stations, such as Paris-Gare de Lyon Station or Zürich Hauptbahnhof, will provide benchmarks for spatial layout, functionality, and user circulation.
   (2) Precedents in smart mobility hubs, like Utrecht Central Station's bike-sharing system or the integration of MaaS platforms in Scandinavian countries.
   (3) Lessons from modular construction projects, such as King's Cross redevelopment.
4. **Bibliographical References:**

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Reflection

1. What is the relation between your graduation (project) topic, the studio topic (if applicable), your master track (A,U,BT,LA,MBE), and your master programme (MSc AUBS)?
   (1) Complex Studio: My project aligns with the studio's focus on urban and architectural complexity, with Milan Central Railway Station serving as an ideal case study that integrates transportation, cultural identity, spatial organization, construction technology, and data utilization. The "Body-Buildings Milan" theme emphasizes integration, adaptability, and system interaction—core principles guiding my proposal to reimagine the station as a smart shared mobility hub.
   (2) Master Track (Architecture): My project explores how architectural design addresses complex challenges, such as integrating advanced technologies, enhancing urban mobility, and creating

meaningful spaces. Its focus on modularity, placemaking, and cultural preservation aligns with the Architecture track's goal of blending technical, functional, and aesthetic considerations.

(3) MSc AUBS: The MSc AUBS program emphasizes interdisciplinary solutions to urban and architectural challenges. My project integrates urban mobility, structural innovation, and cultural heritage preservation, positioning Milan Central Station as a gateway for smart, shared mobility and envisioning a citywide transportation network. It highlights architecture's role in addressing systemic issues while promoting sustainability and enhancing user experience.

2. What is the relevance of your graduation work in the larger social, professional and scientific framework.

(1) Social Framework: The project addresses urban challenges like congestion and environmental sustainability by promoting shared mobility, reducing reliance on private vehicles, and enhancing the station as a civic and cultural hub.

(2) Professional Framework: It explores innovative design solutions, such as integrating advanced technologies and modular systems, offering insights for future professional practices in mobility hub design.

(3) Scientific Framework: The project contributes to research on smart mobility and multimodal transportation, advancing interdisciplinary approaches to sustainable and adaptive urban design.