Session 6.5 Room Fez2
Stations / Architecture – land use and urban settings

Moderator : Mr. Andrea MINUTO RIZZO
FSI, Italy

Session 6.5
Stations / Architecture – land use and urban settings, Speaker lists;

1	2	3	4	5
				
Mr.Borja Aróstegui	Mr.Jiri Merta	Mr.Fabrice Morenon	Mr.Luigi Contestabile	Mr.Fabian Wenner
Spain	Czech Republic	France	Italy	Sweden

UIC HIGHSPEED Morocco 2023
HIGH-SPEED RAIL : THE RIGHT SPEED FOR OUR PLANET
Under the High Patronage of his Majesty King Mohammed VI

THE TRANSFORMATION OF THE GREAT EUROPEAN STATIONS WITH THE ARRIVAL OF THE HIGH-SPEED RAIL

11TH WORLD CONGRESS OF HIGH-SPEED RAIL

Marrakech, 7-10 MARCH 2023

Borja Aróstegui
PhD Architect, IDOM, Spain
Session5-6.5 Stations / Architecture, land use and urban settings

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ABANDONMENT AND RESURRECTION OF RAIL

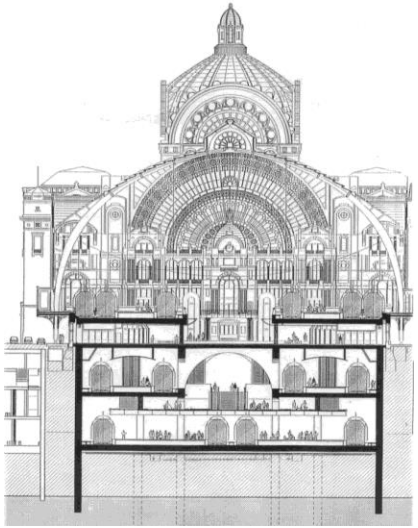
GARE DE MONTPARNASSE. PARIS

PENN STATION. NEW YORK

ATOCHA STATION. MADRID

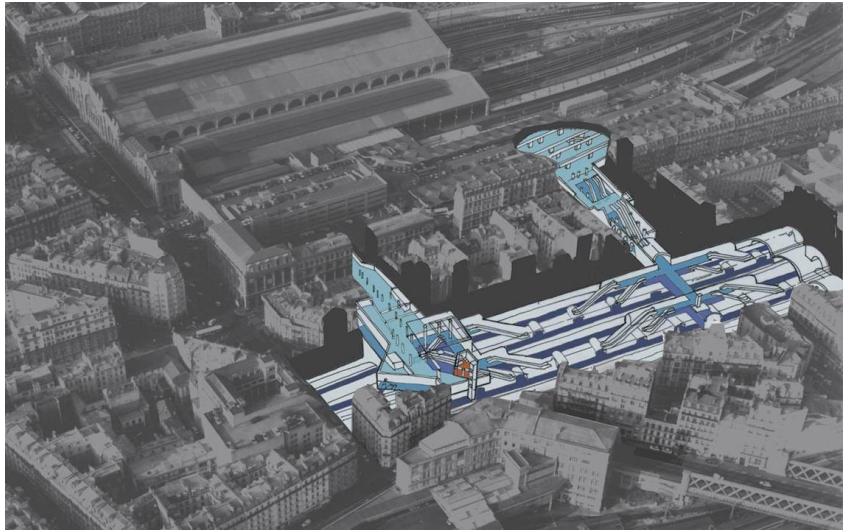
INTERMODALITY

FROM TERMINAL TO THROUGH STATION



ANTWERPEN CENTRAAL. ANTWERP

CONNECTIONS



GARE DU NORD. PARIS

ACCESS CONTROL

ST PANCRAS STATION. LONDON

COMMERCIAL AND CULTURAL DEVELOPMENT

GARE DE LYON. PARIS

ST PANCRAS STATION. LONDON

ATOCHA STATION. MADRID

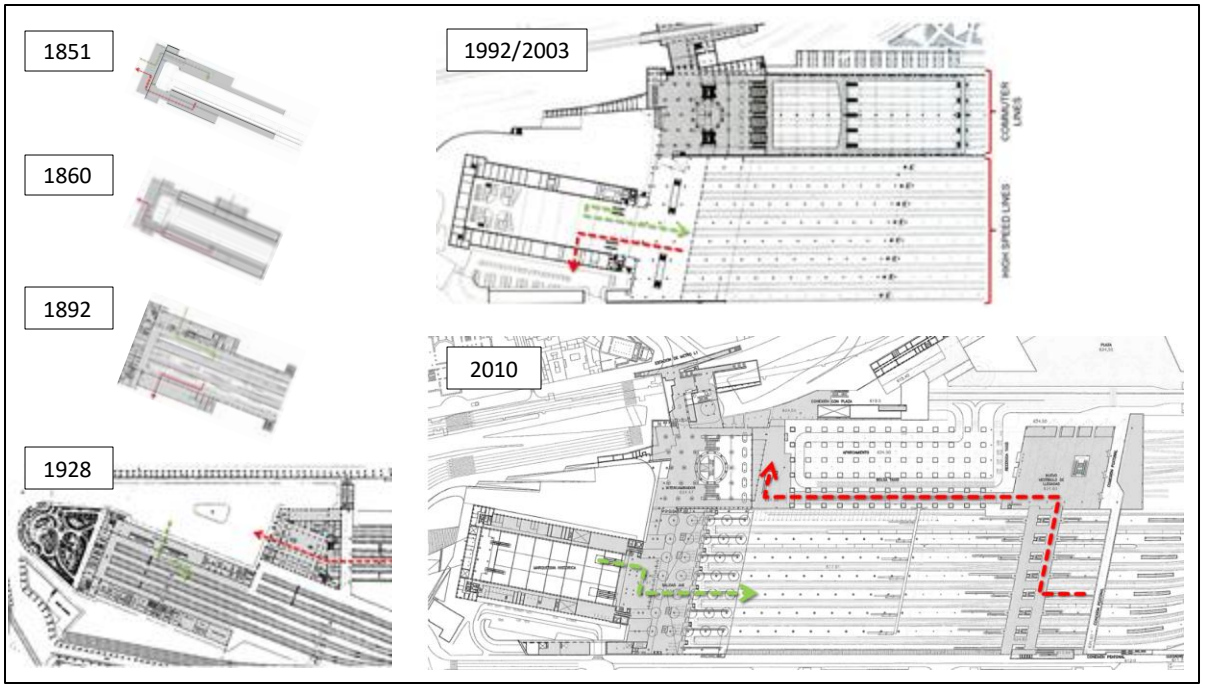
ENHANCEMENT OF THE STATION

REFURBISHMENT OF THE BUIDING

ANTWERPEN CENTRAAL. ANTWERP

ATOCHA STATION. MADRID

SEPARATION OF PASSENGER FLOWS AND LEVELS



ATOCHA STATION. MADRID

ENHANCEMENT OF THE STATION

NEW LATERAL ACCESSES

ST PANCRAS STATION. LONDON

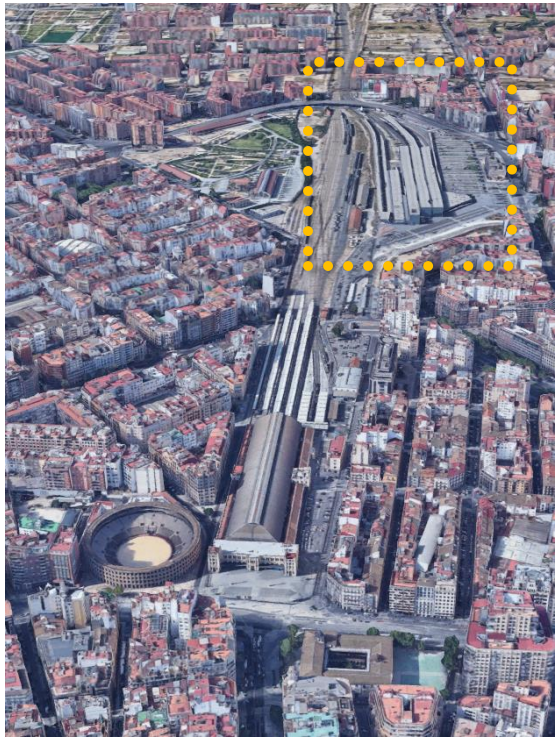
ANTWERPEN CENTRAAL

DECK OVER THE PLATFORMS

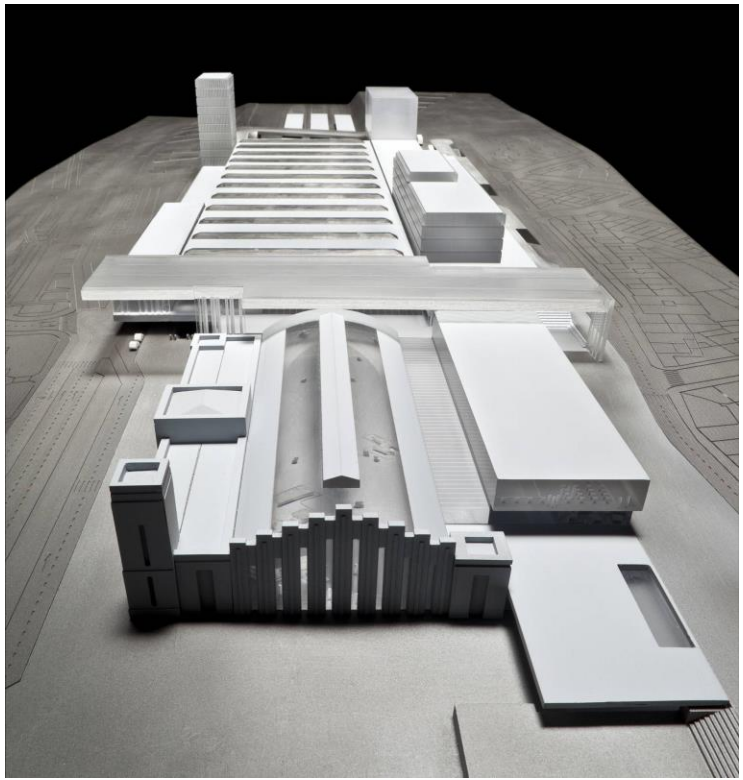
ST PANCRAS STATION. LONDON

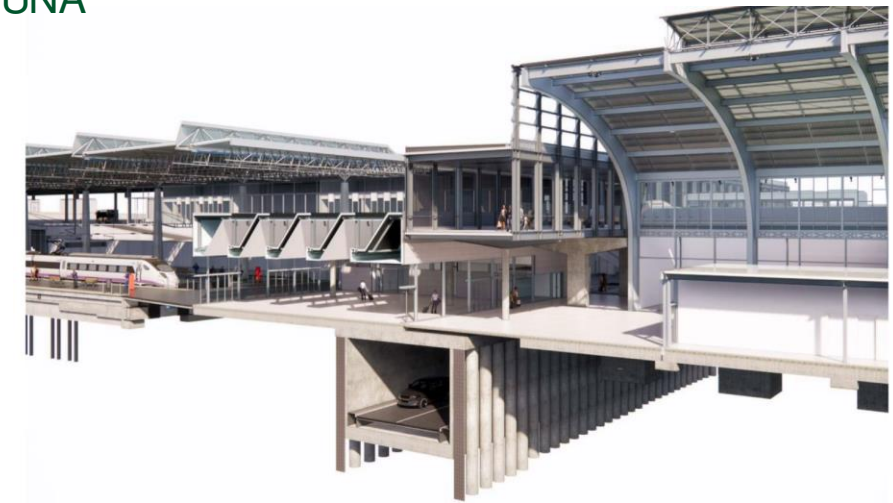
ATOCHA STATION. MADRID

JOAQUÍN SOROLLA HSR STATION. VALENCIA

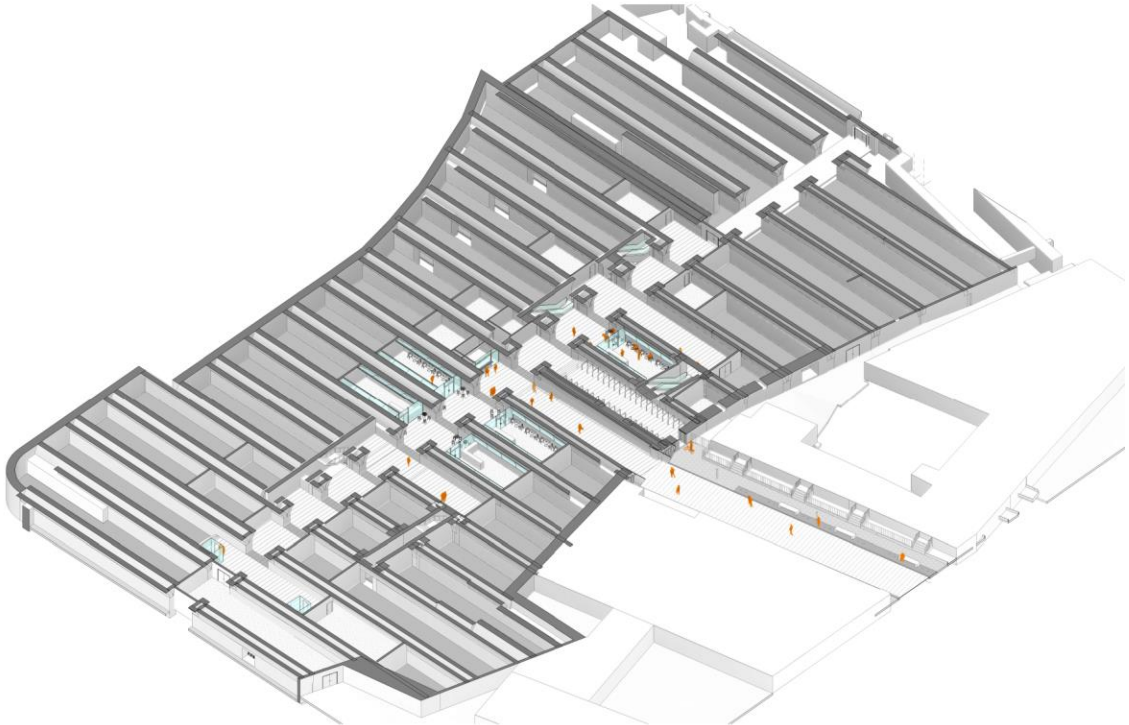


SAN CRISTÓBAL HSR STATION. A CORUÑA

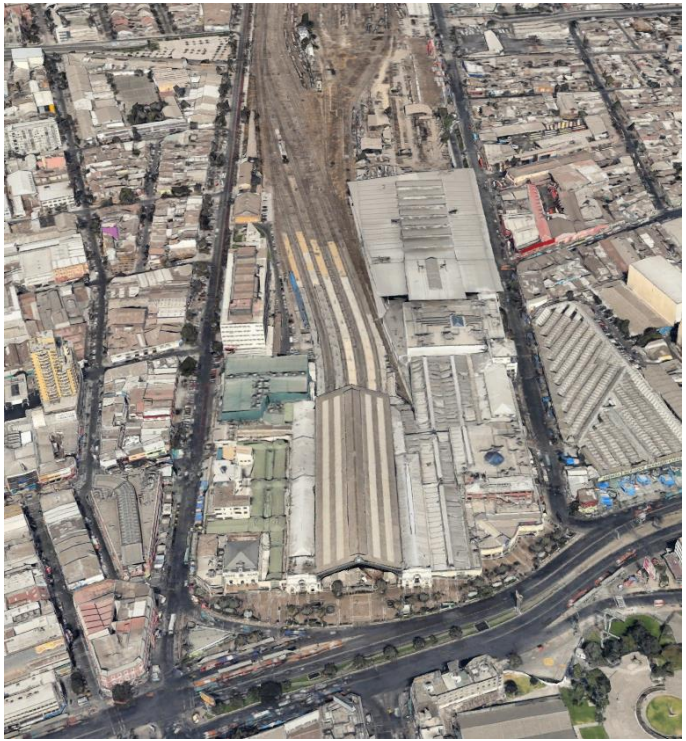


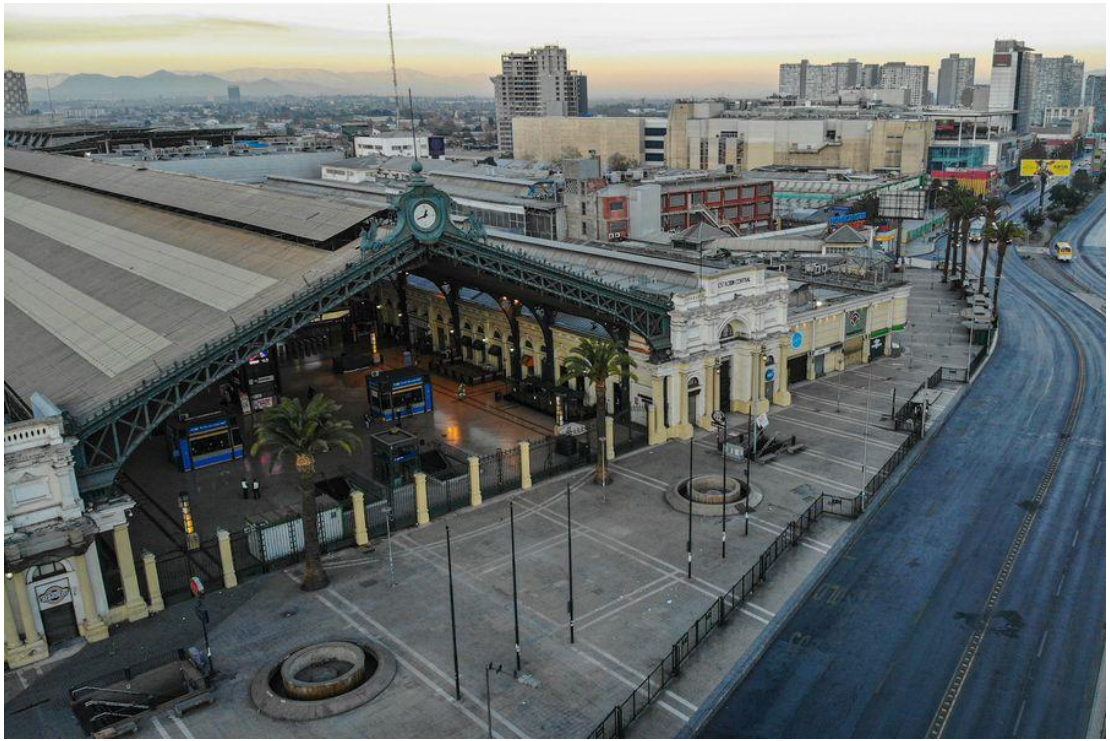


CONNOLLY STATION. DUBLIN

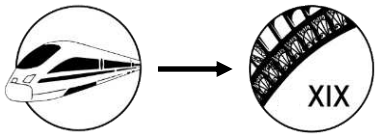


CENTRAL STATION. SANTIAGO DE CHILE

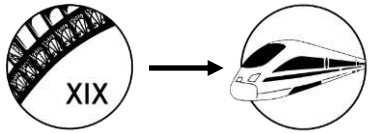




CONCLUSION



- Bring stations back to life
- Enhance the value of the historic building
- Change of use
- Enhance the integration of the monument in the city



- Central location
- Significance and identity

THANK YOU

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barostegui@idom.com

IDOM
www.idom.com

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NEW HSR STATIONS ARCHITECTURE IN THE CZECH REPUBLIC

Jiří Merta
Deputy Director for Technology, High-Speed Lines Construction Management,
Správa železnic (SZCZ), Czechia
Session5-6.5 Stations / Architecture, land use and urban settings

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HOW DO WE PLAN AND DESIGN THE STATIONS?

New HSR stations

- HSR will use current stations in cities
- Several new stations will be build

Architectural competitions

- Station designs are product of architectural competitions
- Architectural competition and subsequent design has no effect on project timeline
- Stations are designed by independent teams along main line preliminary design
- Competitions are based upon data from feasibility studies

French know-how and assistance

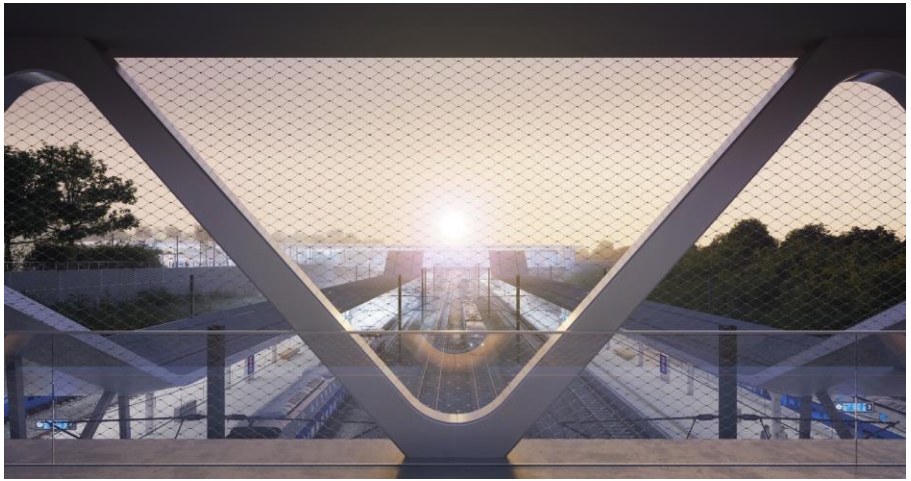
- Consultations and assistance is provided by SNCF Gares & Connexions
- Some requirements are mode detailed than national requirements
- Expert opinions are strongly considered by the jury

PRAGUE-EAST (HSR STATION)

PRAGUE-EAST (HSR STATION)

East outskirts of the capital

- 4 HSR platforms
- Strong Park&Ride usage predicted
- Serves two different HSR lines (East and South-east)



PRAGUE-EAST (HSR STATION)

Transfer hub

- Unique position on two HSR lines
- 20,000 passengers per day expected
- 3,000 parking spaces

PRAGUE-EAST (HSR STATION)

Design

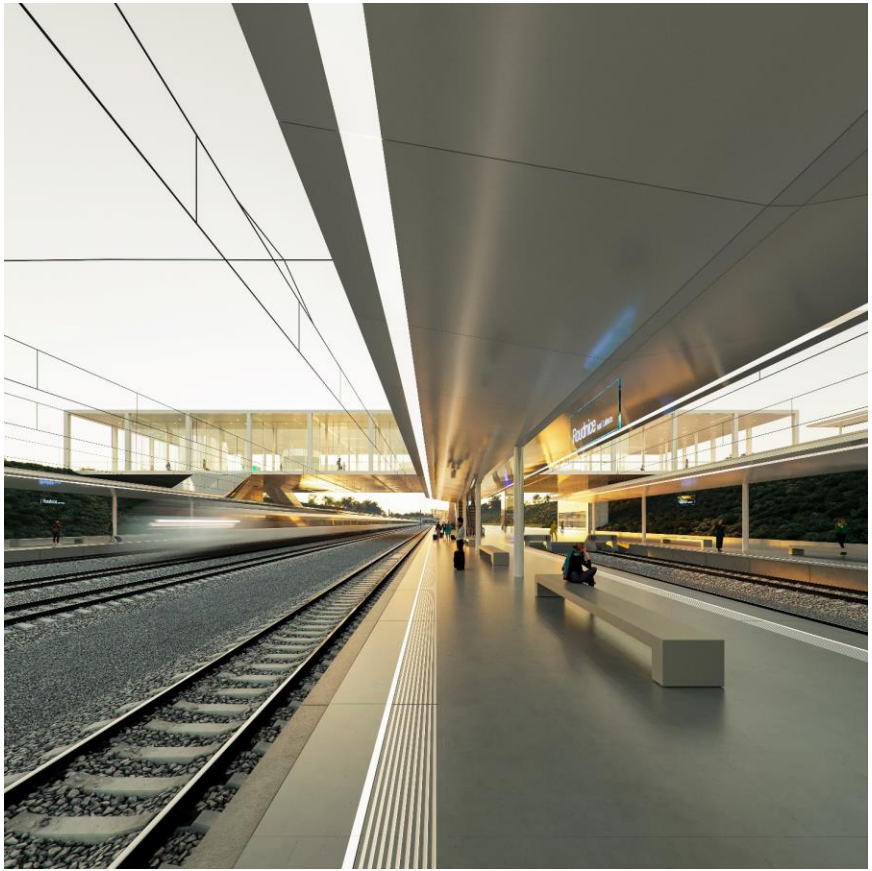
- Emphasis on clarity and easy navigation
- Bus terminal in close proximity
- Designed with commuters in mind
- Enables later development

ROUDNICE NAD LABEM VRT (HSR STATION)

ROUDNICE NAD LABEM VRT (HSR STATION)

Standard HSR station

- 2 HSR platforms and 2 local railway platforms
- Waiting rooms situated also on platform level
- Parking and bus terminal



ROUDNICE NAD LABEM VRT (HSR)

Maintenance base

- Maintenance of HSR Podřipsko
- Only for infrastructure maintenance
- Approx. 100 workers planed
- Conventional railway connection
- National monument nearby

had to be considered.

ROUDNICE NAD LABEM VRT (HSR STATION)

Station surrounding

- Landscaping with possible development
- Bicycle path around HSR to Prague
- Local connections

NEAR FUTURE PLANS FOR ANOTHER HSR STATIONS

New standard HSR stations

- Jihlava VRT (HSR station)
- Pučery VRT (HSR station)
  - both on Prague – Brno HSR line
  - transfer to conventional railway
  - Include nearby maintenance base

Convectional railway station upgraded for HSR services

- Hranice na Moravě
  - Conventional railway station with heavy HSR use.
  - Reconstruction for HSR train lengths and new multimodal hub
- Ústí nad Labem central station
  - New regional capital main railway station project

THANK YOU

vrt@spravazeleznic.cz

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HSR STATIONS AS HUBS OF GREEN MOBILITY

Fabrice Morenon
Managing Director, SNCF Hubs&Connexions, France
Session5-6.5 Stations / Architecture, land use and urban settings

ONCF UIC

GREEN ENERGY IN RAILWAY STATIONS: AN ENVIRONMENTAL CHALLENGE

To meet the current energy challenges, several levers have been identified to reduce the energy consumption of stations and develop the production of renewable energy:

- The replacement of station lighting systems with LEDs
- Optimization and technical management of the buildings
- The replacement of oil and gas boilers by low-carbon alternatives (heat pumps)
- Energy rehabilitation of buildings
- The development of photovoltaic energy sources

Photovoltaic shading in Nîmes

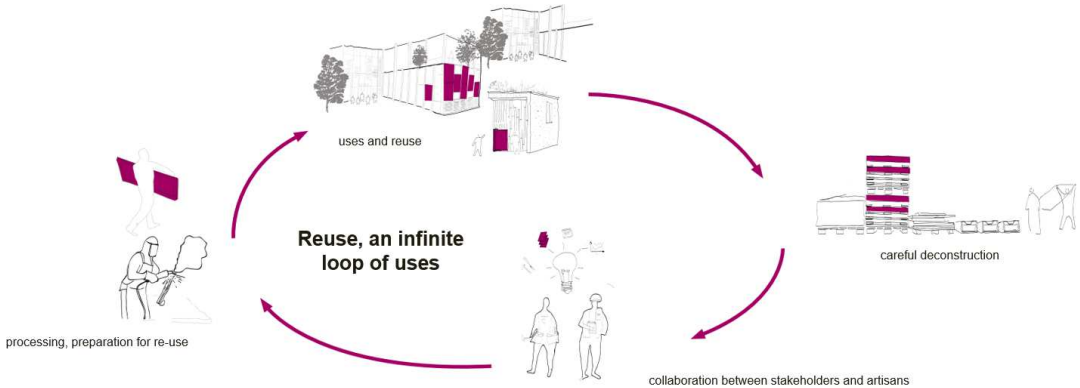
The installation of solar panels solar panels on the car park of the Nîmes Pont-du-Gard station produces four times four times more energy than the annual consumption the station's annual consumption.

ECODESIGN DEVELOPMENT

The goal is to transform the stations into triple E stations: ecological, economical, elegant, designed from the start to consume as little as possible and to be adapted to environmental issues.

To achieve this, we use the EMC2B approach to develop projects along five dimensions

E	M	C	C	B
Energy	Material	Carbon	Climate	Biodiversity



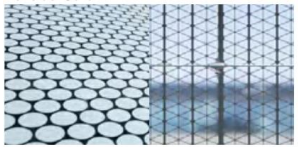
ECODESIGN DEVELOPMENT

In the construction or renovation of railway stations, there are many points of vigilance with regard to eco-design.

- Integration of reused materials
- Choice of materials according to their geographical origin
- Use of bio-based materials
- Do materials in contact with indoor air have an Indoor Air Quality label A+

Wood and concrete, Lyon-Perrache station

Stone, Besançon Franche-Comté station
TGV. Deactivated concrete floor, Nîmes station
Pont-du-Gard



Stratigraphic glass, Strasbourg station.
Glass roof, Austerlitz station, Paris

RECYCLING OF WASTE IN RAILWAY STATIONS

A railway station receives a large number of passengers every day and is therefore a key player in the recycling of waste. Provision is therefore made for this:

Operational waste

- The surface area of the waste room must be sufficient for sorting
- The number of bins must be adapted
- Define the type of sorting of the bins (mono, bi, tri or quinti-flux)

Construction waste

- What is the volume of construction waste (construction and deconstruction)?
- What is the material recovery rate of construction waste?

INTERMOBILITY

By facilitating access to public transport the station helps to reduce the environmental impact and thus pollution. The station is connected to numerous means of transport, making it easier for people to get from point A to point B and thus favor public transport.

80% of the pollution generated by the station comes from the mode of transportation used by the travelers to come to the station (Car, bus, taxis…)

- Suburban train/metro
- Bike/scooter
- Airport
- Tramway
- High speed train

HUBS & CONNEXIONS: DECARBONATED ENERGY PRODUCTION SOLUTIONS WITH PHOTOVOLTAIC PANELS INSTALLED ON SITES AROUND RAILWAY STATIONS IN MOROCCO

Features

- Contract: FASEP Innovative solutions for the decarbonisation of essential services
- Financier: DG Tresor - Natixis
- Beneficiary: Moroccan National Railway Office (ONCF)
- Partner : SNCF Hubs & Connexions
- Financing: 499 400 Euro excl.taxes
- Duration: 2 years (2022/2023)

Objectives

- Create 2 demonstrators on the sites of the stations of Fez and Ben Guérir to demonstrate that the use of photovoltaic panels (Made in France) makes it possible to create decarbonated energy and contributes to the self-consumption of a public structure.
- Reduce the carbon footprint of the stations but also that of the users (the shade generated by the panels)
- Enable the replicability of the green and innovative solution demonstrator in all the stations of Morocco through a sustainable economic model (Capex and Opex)
- Initiate a long-term partnership (20 years) and/or create a JV between SNCF Hubs & Connexions and ONCF for the operation and maintenance of green energy production structures in all Moroccan stations (40 sites)/ Potential production of 20 million KW per hour.

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StationLAND - a location intelligence platform for station placement

Sara Venturoni, Luigi Contestabile
Stations Management, RFI, Italy
Session5-6.5 Stations / Architecture, land use and urban settings

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What's behind this "Outstanding Innovations in Infrastructure and Public Mobility*" ?

* UIC World Conference Award, San Diego, 10 July 2022

StationLAND - a location intelligence platform for station placement

A growing group of **young, multidisciplinar, talented** people

Sara Venturoni

Luigi Contestabile

The construction of a **Stakeholders Network** to share **Data**

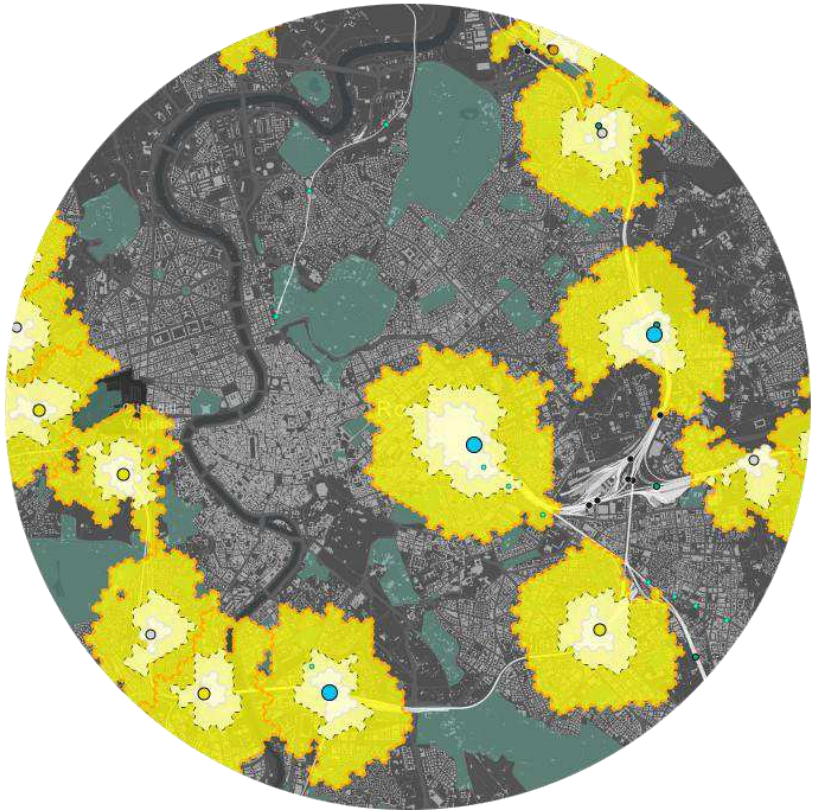
A COLLABORATIVE PLATFORM

A digital common desk to work together with our Stakeholders Network (Institutions, Regions, Cities, Transport Operators etc.) to share value and boost ESG Targets

The definition of every station's **catchment area**

PEDESTRIAN AREAS

50% of passengers live or work inside the pedestrian catchment area of the Italian stations (15 minutes by foot)



The widest geospatial database for sustainable **transport** in Italy

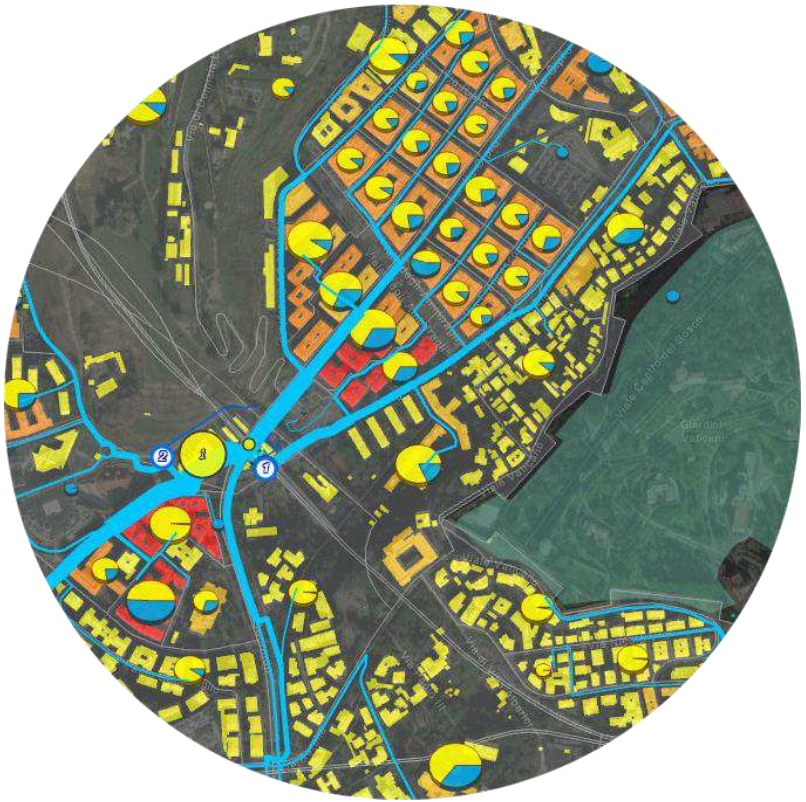
TAXI, TRAM, BUS, BIKE, SHARING

- Taxi Stop
- Tram/Trolleybus Line
- Metro Line
- Bus Line
- Bike Lane
- Sharing - *Free Floating/Station Based*

The location of the **potential mobility demand**, Nationwide

FLOWS & RESIDENTS BY CENSUS

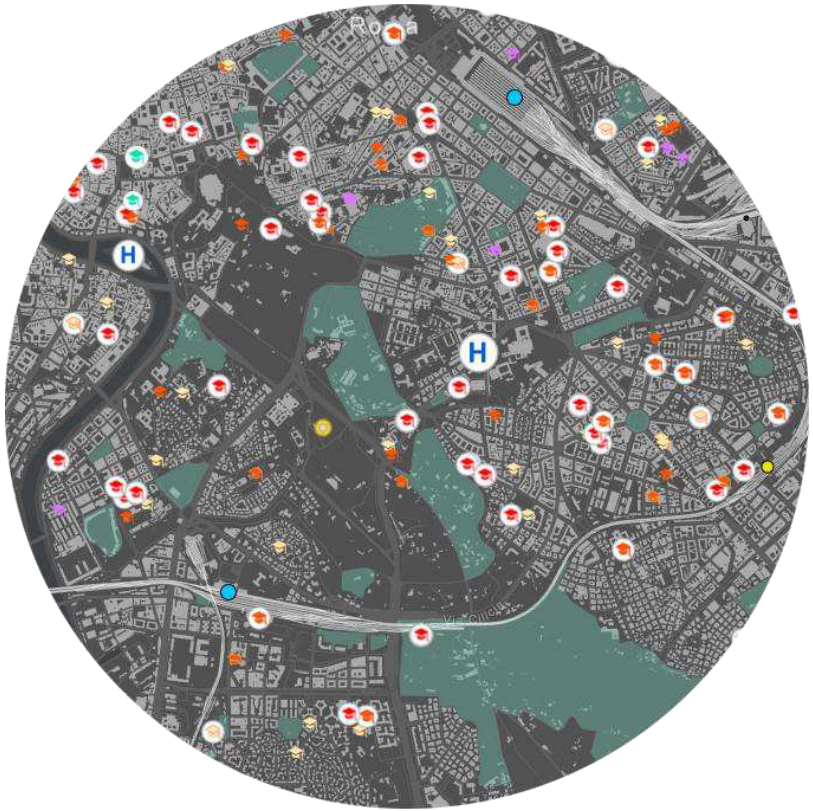
- Potential Access Flow
- Residents & Workers *by census*
- Residents & Workers *by building*



The placement of all main **Points of Interest** in the urban/rural environment

POINT OF INTEREST

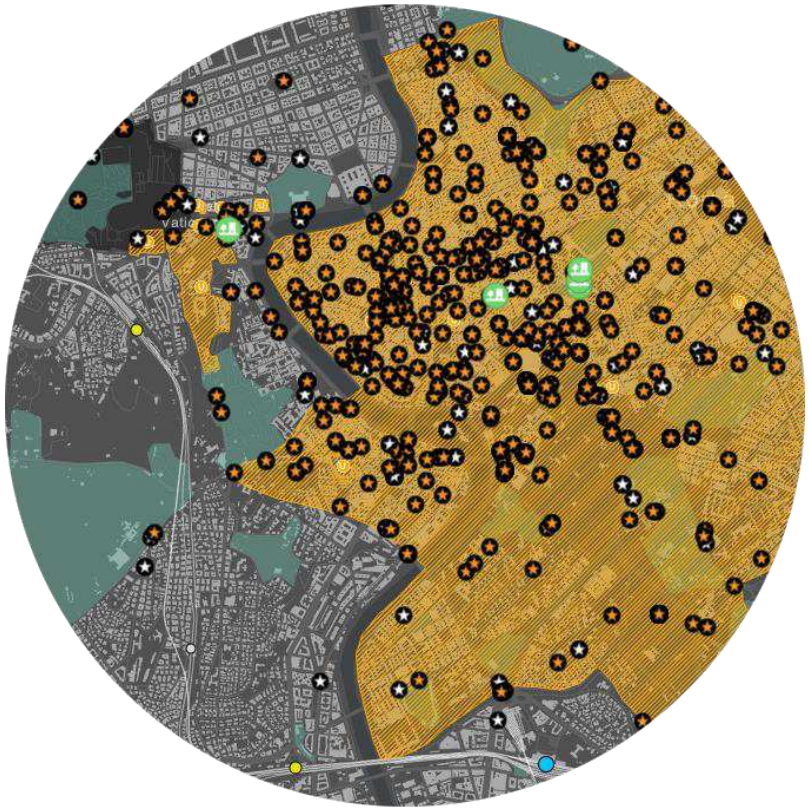
- University & Departments
- School
- Hospital
- Sport's Center
- Shopping centers



The map of all relevant **tourists' attractions**

TOURISM

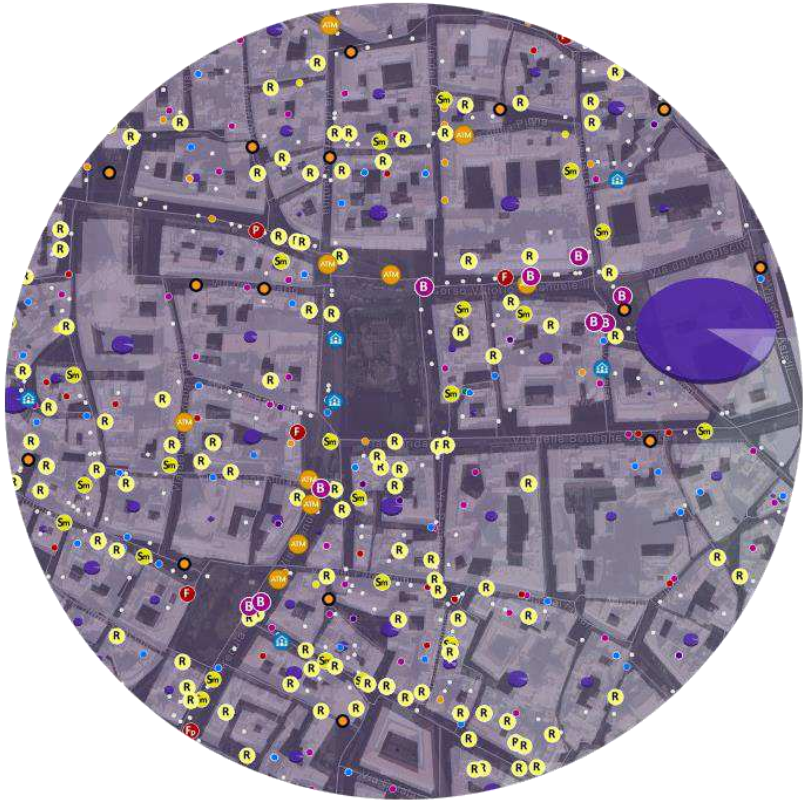
- Monuments
- Tourist Attractions
- UNESCO sites
- Hotels
- Park (*Artistic & Historical Interest*)
- Villa (*Artistic & Historical Interest*)



And much more...

CITIZENS' SERVICES, COMMERCIAL & …

- Bank, ATM
- Bar, Restaurant
- Pharmacy, Medical Clinic
- Theatre
- Church
- Market



Place the HS Station and compare its catchment area with private car's

STAZIONI

Visualizzate in ordine di arrivo e tempo

- ROMA TIBURTINA in 30
- CASERTA in 90
- FIRENZE CAMPO MARTE in 90
- FIUMICINO AEROPORTO in 90
- NAPOLI CENTRALE in 90
- AMOROSI MELIZZANO in 180
- BATTIPAGLIA in 180
- BENEVENTO in 180
- BOLOGNA C.LE/AV in 180
- BOLOGNA CENTRALE in 180
- FERRARA in 180
- FIRENZE SANTA MARIA NOVELLA in 180
- MARATEA in 180
- MILANO ROGOREDO in 180
- MODENA in 180
- PONTE CASALDUNI in 180

Numero di stazioni raggiunte

Treni tra le 7,00 e le 9,00 in un giorno feriale medio

21

Residenti

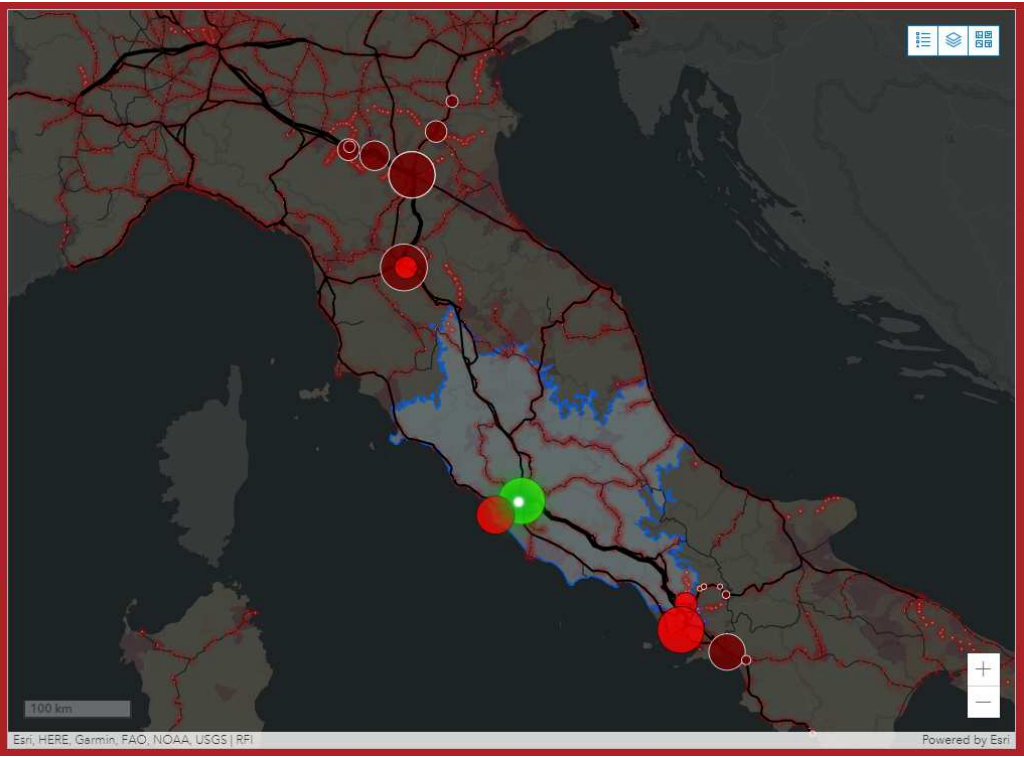
418.899

Bacino Pedonale *(15 min)* di tutte le stazioni raggiunte

Addetti

183.148

Bacino Pedonale *(15 min)* di tutte le stazioni raggiunte



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HIGH SPEED RAIL AS URBAN GENERATOR?

Dr.-Ing. Fabian Wenner
Postdoctoral Researcher, Technical University of Munich, Germany
Session5-6.5 Stations / Architecture, land use and urban settings

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FRAMEWORK & RESEARCH QUESTION

- **Accessibility is a locational factor** for firms and households.
- **High-Speed Rail (HSR)** has contributed to and profited from a reinvigoration of passenger rail transport: high public investments in the last decades, multiple lines planned or in construction.
- Particularly around “rural” HSR stations: Substantial accessibility increase.

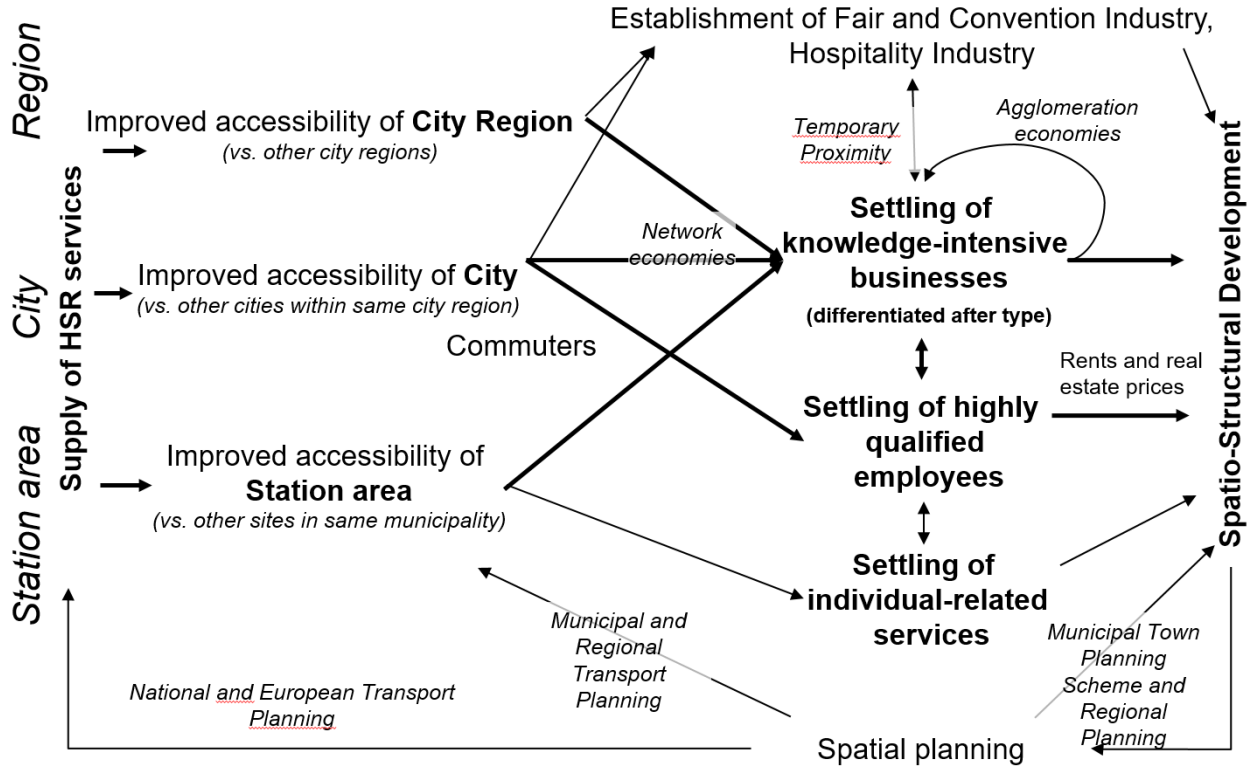
- Expectations by (local) stakeholders that new HSR stations lead to **economic development**, particularly to **urban development in the immediate vicinity** of new stations.
- Planning goal: “**transit-oriented development**”

- **Research Question:** Can this interdependence de facto be observed?
- Europe as study area, due to demographic and economic framework conditions

THEORETICAL LENSES

- (Inter-)**Regional development theories** – regional convergence (Borts and Stein 1964) vs. polarisation theory (Myrdal 1957), New Economic Geography (Krugman 1991; Puga 2008).
- (City-regional) **Land use** theories and models - monocentric city model (Alonso 1964), constant travel time budget (Lehner 1966, Zahavi and Ryan 1980; Marchetti 1994), transport-land use feedback cycle (Wegener 1996)
- **Relational** spatial economic approaches – localised agglomeration and network externalities (Capello 2000; Andersson & Karlsson 2004; Maskell, Bathelt and Malmberg 2006; Bentlage 2014; Meijers, Hoogerbrugge and Cardoso 2017)
- **Planning** perspective – integrated urban and transport planning, „transit-oriented development“, node-place-model (Bertolini 1999)

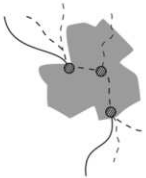
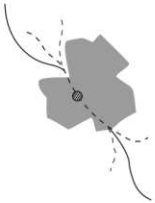
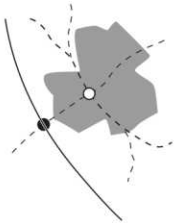
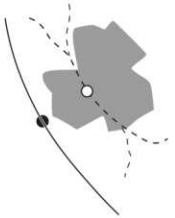
IMPACT MODEL



RESEARCH DESIGN

- Database of **232 HSR stations in operation or under construction in Europe**
- Typology of **seven station types** according to connectivity (spatial, intermodal, operational)
- Analysis of **land use change in a 1500m buffer** zone around the station between 1990 and 2018 in five time steps, using CORINE land cover data

STATION TYPOLOGY (ADAPTED FROM TROIN 1997)

Schematic Visualisation							
Type	**Type 1** Metropolitan Multi-Hub	**Type 2** Existing Urban Hub	**Type 3** New Node	**Type 4** Bypass/Branch	**Type 5** Distributed Services	**Type 6** Peripheral Replacement	**Type 7** Regional Halt
Accessibility	High by public transport, low by car	High by public transport, low by car	High by public transport and car	High by public transport, reasonable by car	Peripheral station: reasonable by public transport, high by car	Peripheral station often not accessible by local and regional public transport, high by car	Often not accessible by local and regional public transport, reasonable by car
Construction Cost	High	High	Medium	Medium	Medium	Low	Low
Examples of HS stations	Berlin, Paris, Milano	Würzburg Hbf, Córdoba, Bordeaux-St-Jean, Liège-Guillemins, Bologna Centrale	Montabaur, Ciudad Real, Ashford International	Poitiers, Coburg, Breda, Arezzo, Lleida Pirineus	Champagne-Ardenne TGV, Siegburg/Bonn, Reggio Emilia AV Mediopadana, Køge Nord	Guadalajara-Yebes, Limburg Süd, Le Creusot	TGV Haute-Picardie Villanueva de Cordoba-Los Pedroches, Kinding (Altmühltal)

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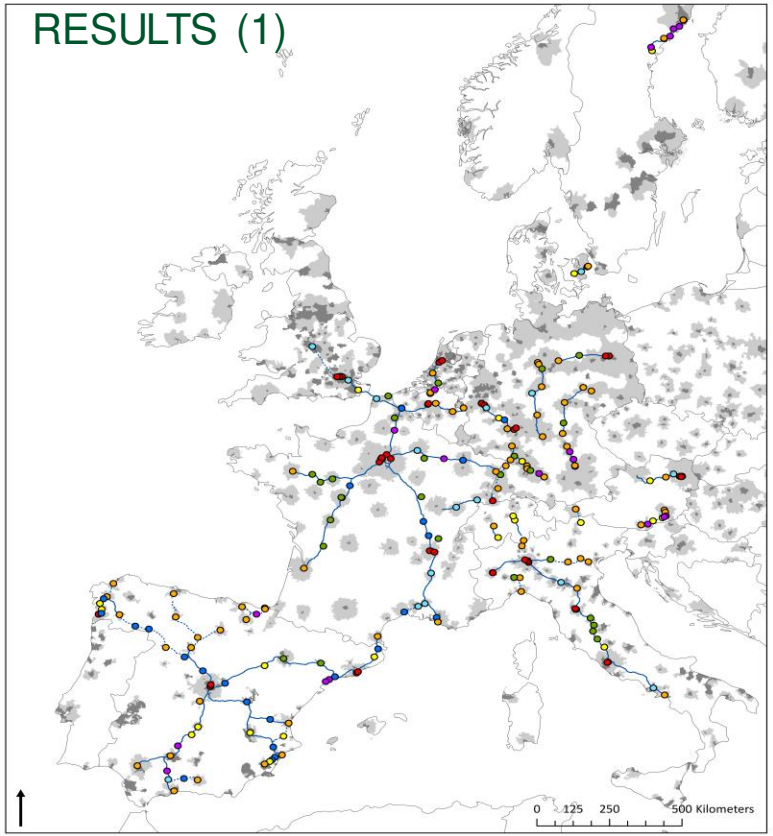
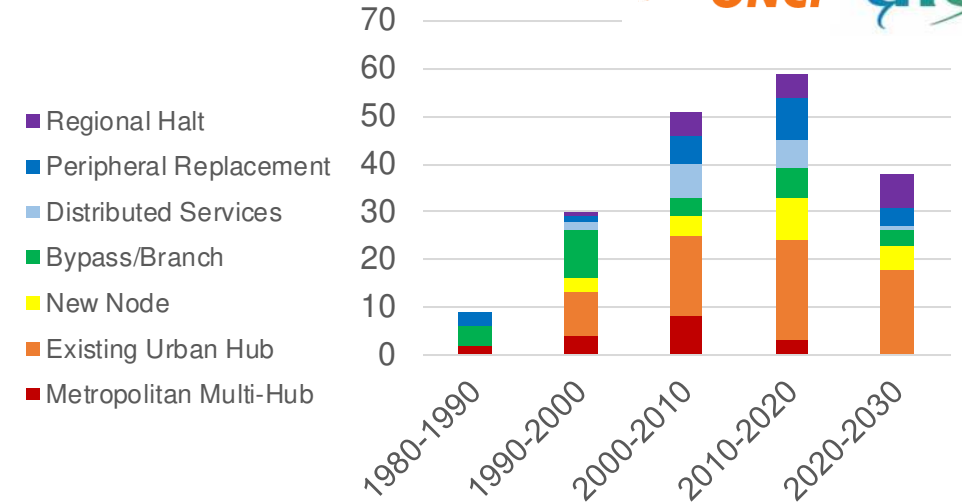
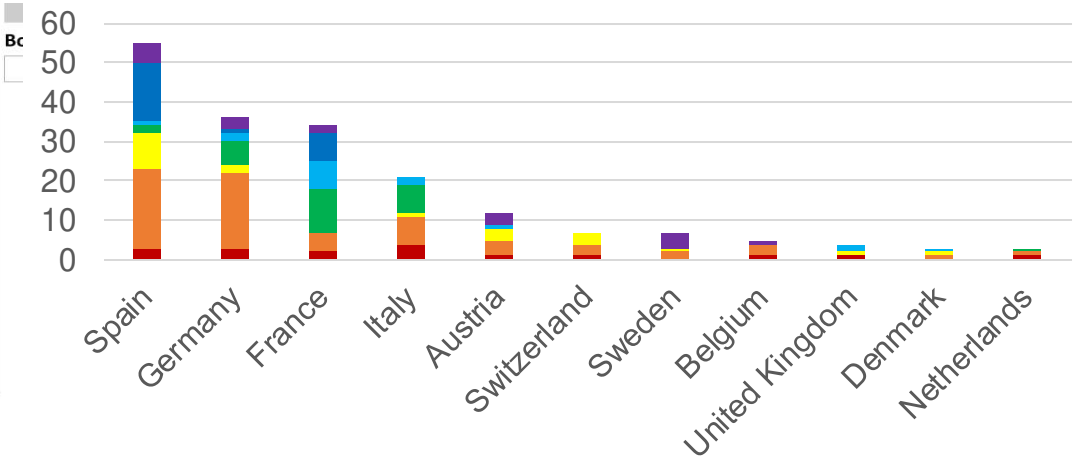
RESULTS (1)

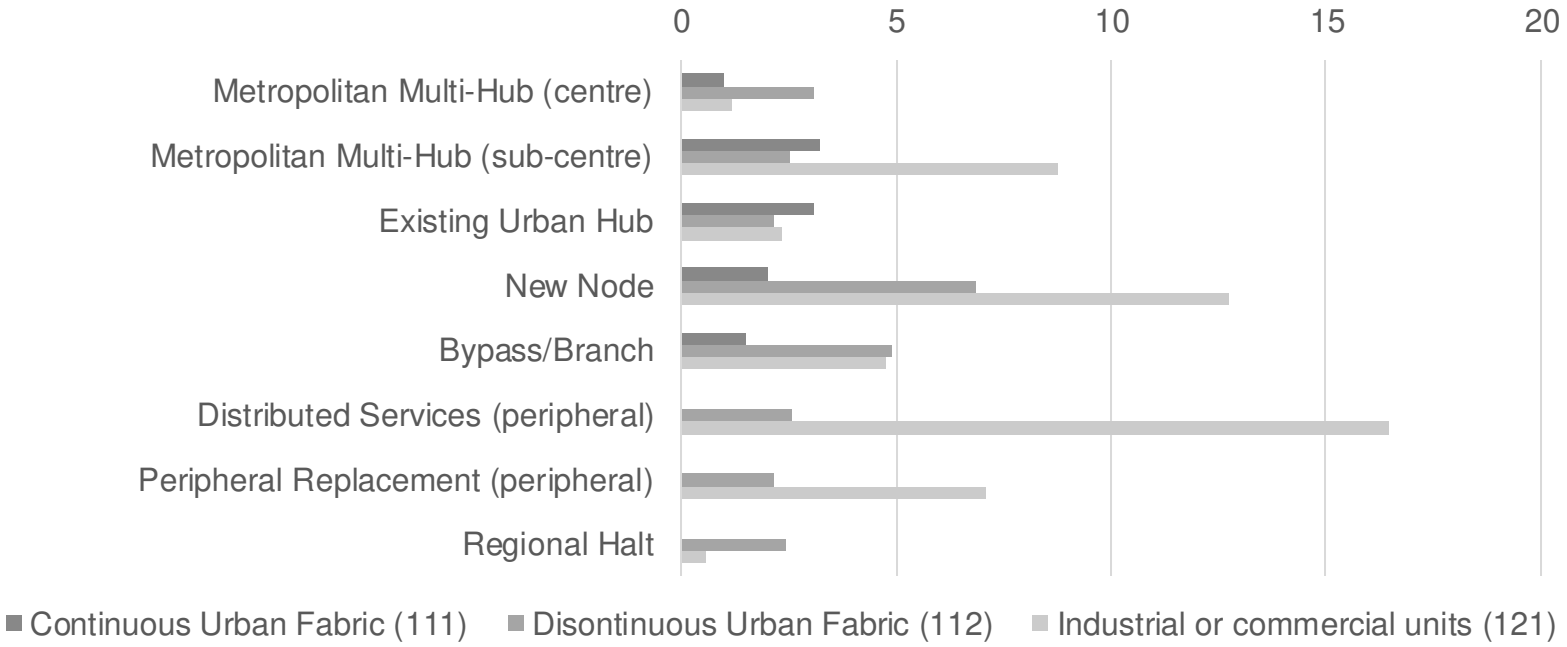






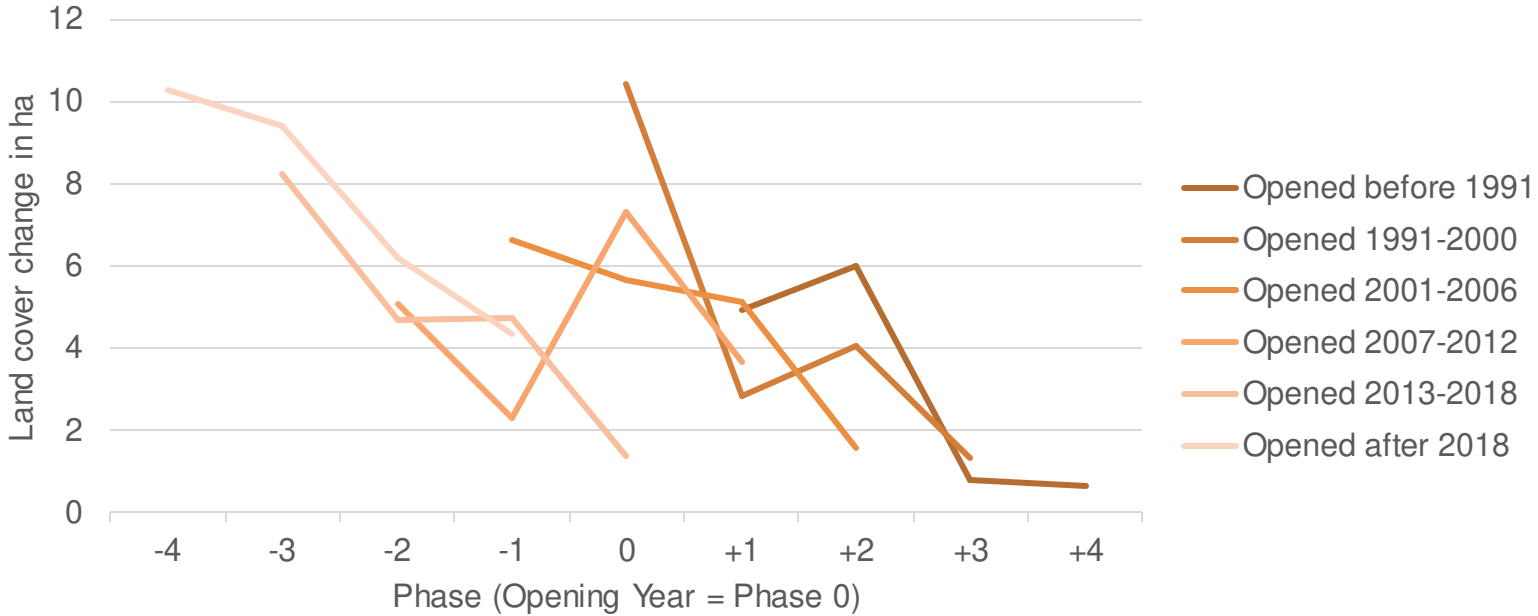
RESULTS (II)

Average Total Increase of Land Cover Types in Hectares in Phases -1 to +2 by Station Type



RESULTS (III)

Average Size of Land Cover Change in Hectares by Phase and Opening Year Cohort (Station Opening: Phase 0)



Legend

- 1500m Station Radius
- HSR Station
- HSR Line
- Conventional Rail Line

Land Cover Change

Recent changes more transparent

- to Continuous urban fabric
- to Discontinuous urban fabric
- to Industrial or commercial units
- to Green urban areas
- to Sport and leisure facilities

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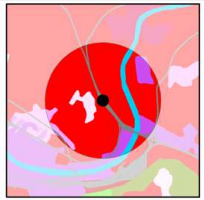
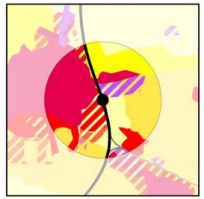
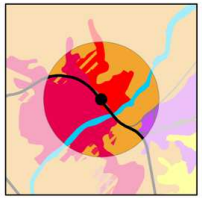
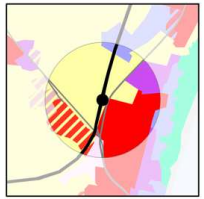
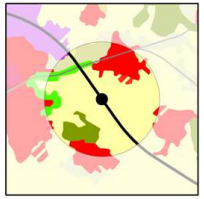
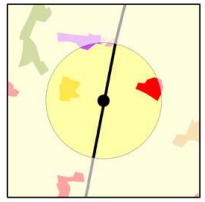
SUMMARY

Schematic Visualisation							
Type	**Type 1** Metropolitan Multi-Hub	**Type 2** Existing Urban Hub	**Type 3** New Node	**Type 4** Bypass/Branch	**Type 5** Distributed Services	**Type 6** Peripheral Replacement	**Type 7** Regional Halt
Example	Paris Gare Montparnasse, FR	Liège-Guillemins, BE	Ciudad Real, ES	Lleida-Pirineus, ES	Køge Nord, DK	Limburg Süd, DE	TGV Haute Picardie, FR
Urban Development Impact	Theoretically very high, but lack of available building space. Opportunities for sub-centres and secondary stations.	Theoretically very high, but lack of available building space.	High, attractive for residential and commercial uses.	Medium, attractive for residential and commercial uses.	Peripheral station: High, attractive for commercial uses	Peripheral station: Medium, attractive for commercial uses	Low

CONCLUSION

- Slight tendency towards **more integrated station locations** in the last decades
- **Urban fringe** stations associated more with **commercial developments**, **central ones with mixed use**
- **Neither inner-city nor exurban locations** can be associated with **strong land use change**
- **Urban fringe locations** with available building land, coupled with good local public transport integration seem to be **most conductive to new urban development**
- But: Results not very marked: Importance of other factors for urban development

THANK YOU

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Further Reading:

Wenner, Fabian & Thierstein, Alain (2022): *High Speed Rail as Urban Generator? An Analysis of Land Use Change around Stations.* European Planning Studies 30 (2), 227-250.

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