

Railway stations as spaces for the new mobility

A case study to analyse correlations between urbanisation processes, accessibility of public transport infrastructures and modal shift

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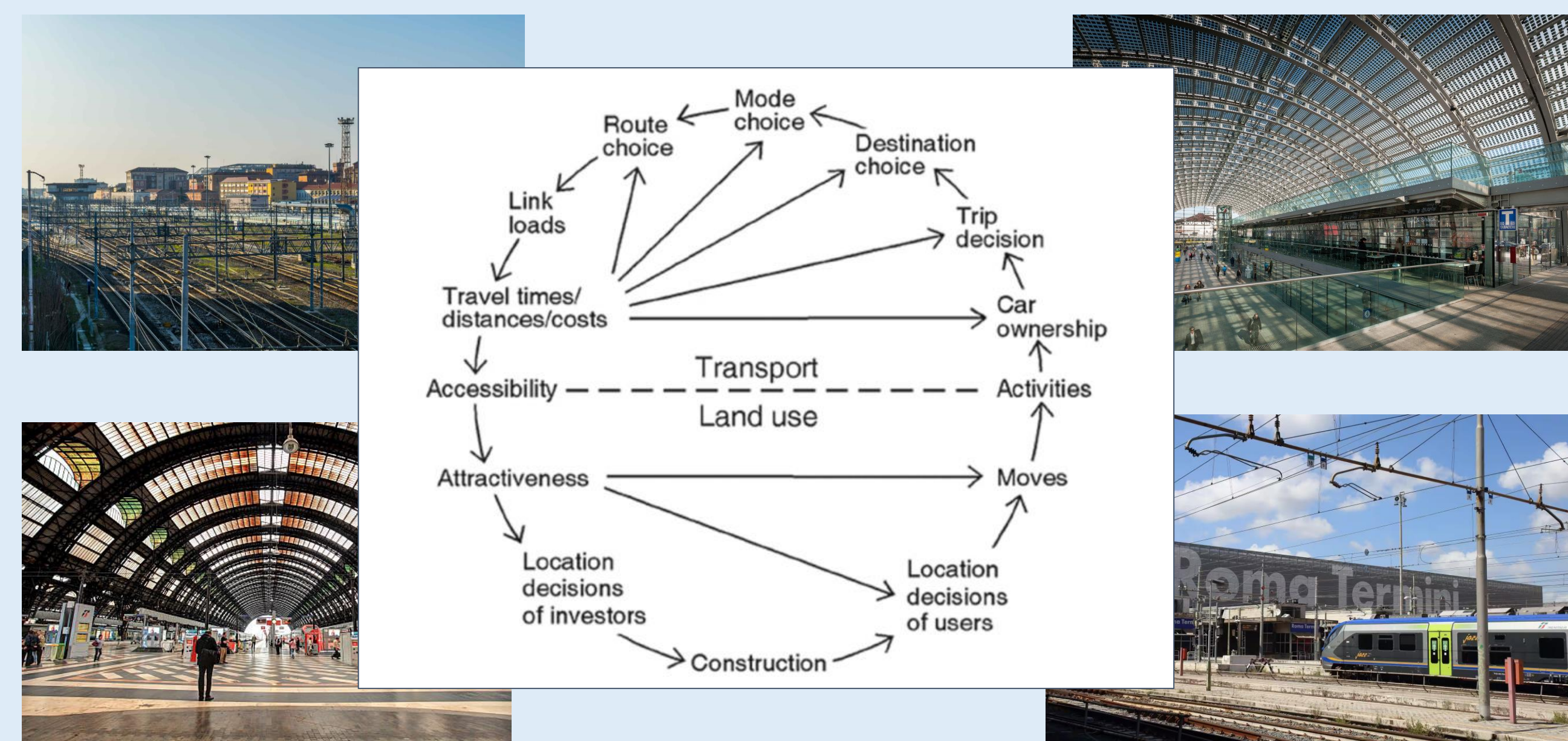
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Context

With the goal of sustainable transport, **intermodality** could be one key objective to be pursued when looking for a more **environmentally and socially sustainable** alternative to the private car.

Railway stations cover a strategic role as places where **accessibility** to different modes of transport must be realised effectively, being also **central attractive poles within the urban heritage**.

Italy can leverage on a very capillary railway network. Such proximity could allow to **shape the travel behaviour and improve the land-use** according to the **transit-oriented development (TOD)** criteria.



OBJECTIVES

1 Investigate how people perceive the quality of railway stations as regards their **travel habits**

2 Understand how the **stations' perception affects the use of rail transport** and the propensity towards intermodality

3 Identify the design, constructional and functional interventions capable of **increase railway stations' attractiveness**

4 Provide useful **addresses for policy-makers** and urban planners

Methodology

1 Survey planning and design

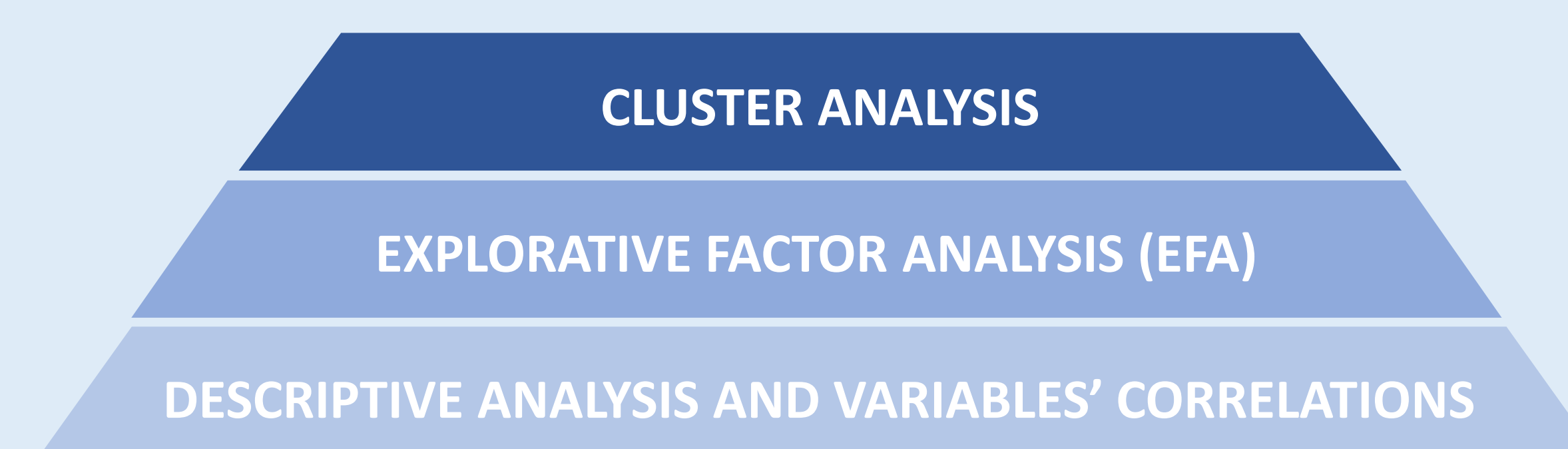
A specific questionnaire has been designed to understand **people's travel habits and behaviour**, mainly in northern Italy

2 Sampling plan and survey administration

The **"snowball" sampling plan** has involved **+900 people** in a CAWI (Computer Assisted Web Interview) survey administered online between May 30 and July 8, 2022

3 Data analysis design

Over the 381 valid observations, the statistical analysis has used different techniques as **Analysis of Variance (ANOVA)**, **Explorative Factor Analysis (EFA)**, **Cluster Analysis**



Results and main outcomes



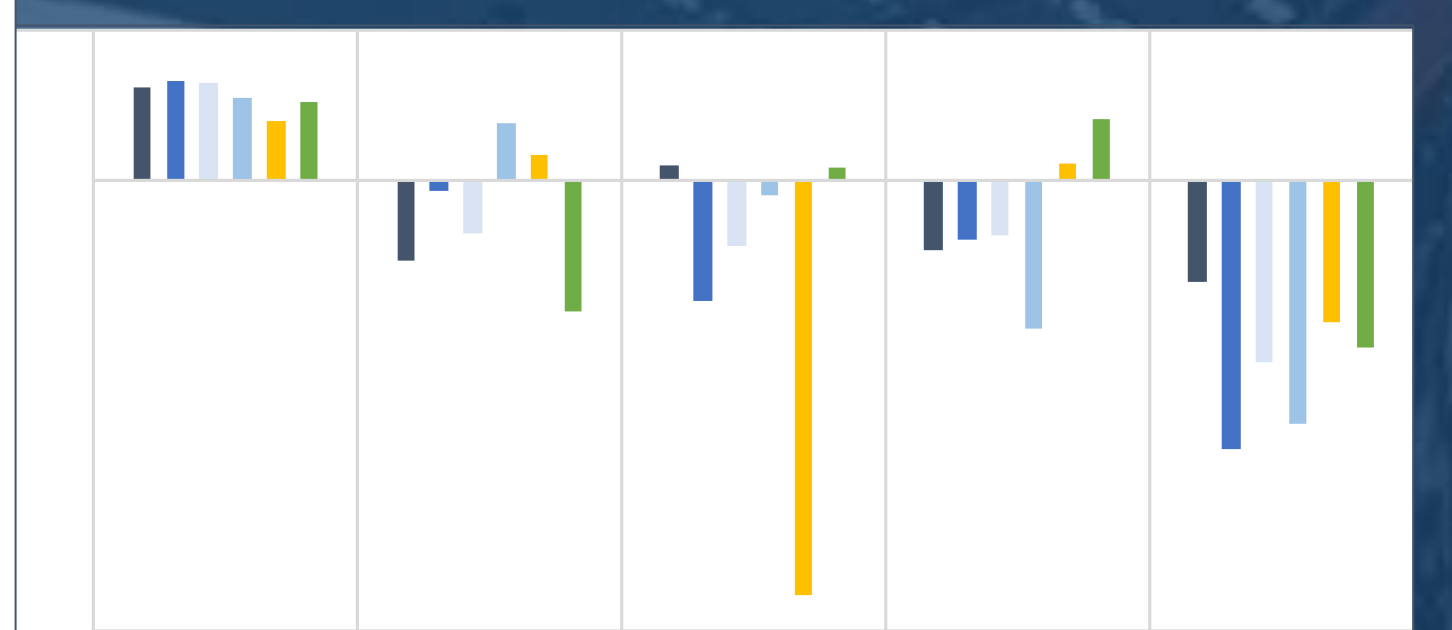
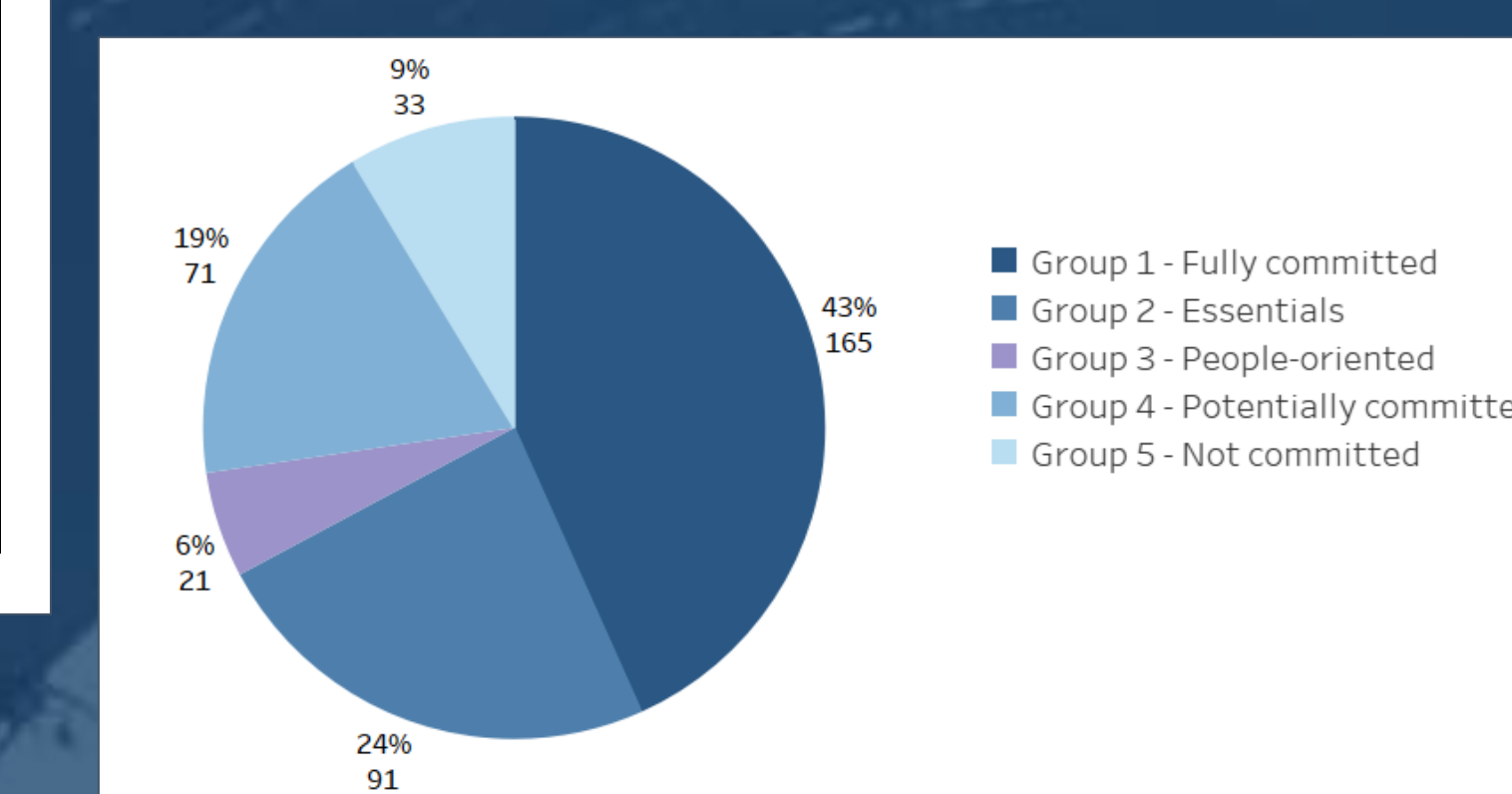
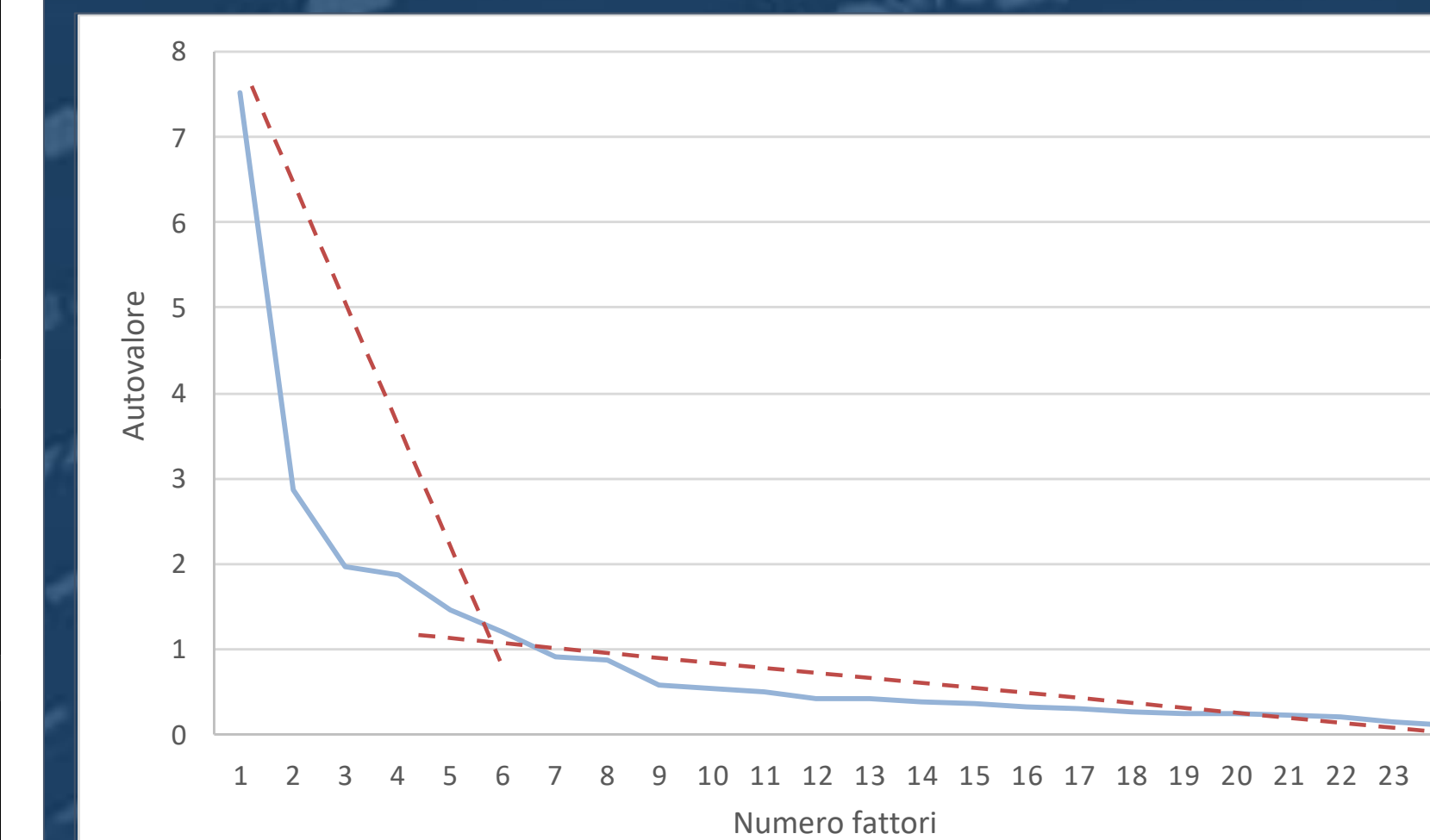
A **significant correlation** (< 0.001) has been observed between the **perceived quality of the urban heritage** around the stations and the **perceived sense of safety**



32 variables have been grouped according to the scree-plot method performing the EFA, finding **6 latent factor** on which focus to understand the priorities of the interviewees

Model matrix*	Factor	1	2	3	4	5	6
SOCLSPACE_IN		.861					
SOCLSPACE_REL		.820					
COWRKSPACE_IN		.772					
RETAIL_IN		.576					
RETSERV_REL		.537					
TRVEXP_TPL		.453					
ACC_TPL		.735					
PMRACC_REL		.656					
PEDACC_REL		.646					
TRVCOMB_TPL		.620					
QUAL_TPL		.595					
LIGHT_UP				.810			
WAYFINDING_UP				.706			
ELEV_UP				.704			
WAYLINE_UP				.704			
PULINT_REL				.960			
SECUR_REL				.715			
PULIST_REL				.677			
DISP_TPL					.853		
COORD_TPL					.813		
FREQ_TPL					.757		
BIKEPATH_UP						.773	
BIKEPARK_IN						.706	
BIKEACC_REL						.651	

Extraction method: Principal axis factorization; Rotation method: Promax with Kaiser normalization.
*. Convergence for rotation performed in 6 iterations.



Between the **5 identified clusters**, the group labelled as **"People oriented"** is concerned about potential of railway stations to improve the quality of life because of cycling accessibility and **attractiveness as urban poles**, in a new people-centered approach that goes **beyond their exclusive function as transport nodes**.

	1 Fully committed	2 Essentials	3 People-oriented	4 Potentially committed	5 Uncommitted
Sociality and living	0,62	-0,54	0,09	-0,46	-0,67
Accessibility and overall quality	0,67	-0,07	-0,80	-0,40	-1,78
Walkability	0,65	-0,35	-0,44	-0,37	-1,21
Cleaning and safety	0,55	0,38	-0,09	-0,98	-1,62
Transport services planning	0,40	0,16	-2,75	0,11	-0,94
Cycling accessibility	0,51	-0,87	0,09	0,40	-1,10

The **"Essentials"** and the **"Potentially committed"** would be encouraged to use rail transport by **interventions on the level of service** of railway stations



Heavily improve cleanliness, decorum and, indirectly, safety perception, which came out to be a critical issues hindering the attendance of railway stations.



Provide adequate cycling infrastructures where cycling could **balance part of the deficiencies of the public transport system** connecting railway stations.



Improve the attractiveness of stations as urban poles, having found that the **"vitality"** could **reduce the danger of urban and social degradation** and abandonment.