THE MENDING TERMINI STATION METHOD: THE STRATEGIC PLANNING OF THE CITY

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Abstract

The aim of this study is to propose an adaptable, multidisciplinary and all-inclusive method, which considers the intervention on the infrastructure system and nodes as a strategic priority, in order to ensure a level of planning that allows the concatenation of subsequent interventions.

The development of a method is finalized to the implementation of the necessary actions to complete a strategic plan aimed at a radical transformation of the city. The case-study presented deals with Termini station and the city of Rome, with the long-term objective of reversing the trend in mobility patterns and enhancing the area within the Aurelian Walls (UNESCO heritage). The current state of infrastructure systems and nodes offers possibilities, sometimes supported by a debate rooted in time, able to address the interests of various actors. Therefore, by establishing the intervention on the infrastructure as the first step, necessary to recalibrate the balance between the urban systems, it is possible to preview direct effects on the nodes and on the city that allow to further transformations. Among these, the recovery of urban land is a fundamental step of the method, achievable through the burying of part of the infrastructure or stations. The feasibility of projects of this scale is often linked to the liberalisation of the railway system, which has given ownership of the areas to public companies governed by private law, making them promoters and guarantors of the transformations, through agreements with public authorities.

On the base of the transformation of the infrastructural system, it is possible to carry out interventions on mobility, on the environmental system and of urban requalification, able to establish the main lines of development of the city. These interventions can be extended in time, in order to make urban transformation sustainable and less radical, and must work as catalysts to achieve the strategic objectives preponed. To provide a guideline for future projects, *Mending Termini Station* ends with the planning of a new urban polarity on the area of the ex-railway yard, a proposal that defines limits and prescriptions regarding services, functions, landscape and formal relationship with the context.

Methodological research is built through a critical re-reading of virtuous examples that, at an international level, have triggered large-scale urban regeneration processes. In the Maine-Montparnasse project in Paris, the objective was reached through the replacement of the 19th century station, the insertion of new managerial, commercial and residential functions, and a new urban park above the tracks. The positive effect of this intervention still brings a continuous investment to make Montparnasse an innovative, sustainable, technological and strongly identitary pole. The King's Cross Central project in London was born in response to a phase of serious decline in the area, using the new link to the Channel Tunnel as an important incentive for urban regeneration and an opportunity for revitalization of the entire district. Starting from the recovery of the stations, the area becomes a new hub for mixed use and the enhancement of public spaces is considered a priority to ensure an improvement in urban life and economic development. The Seven Yards of Milan project is the result of the possibility of converting disused railway areas, which are interesting for their size and strategic location. The fundamental objective is to rethink the way of conceiving the city itself, in a multicentric and integrated way, through a planning, also in terms of time, of the interventions.

The proven validity of this methodology is spontaneous if the basis of the process is a strategic planning aimed at achieving the macro-objective of building the city of tomorrow. The further development of this study fits, in part, into the strategic planning of processes that have the same basic objectives. The applications, which show interested results,

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are the Zuidasdok project for Amsterdam and the competition for the redevelopment of public spaces in the Charles De Gaulle airport district in Paris.

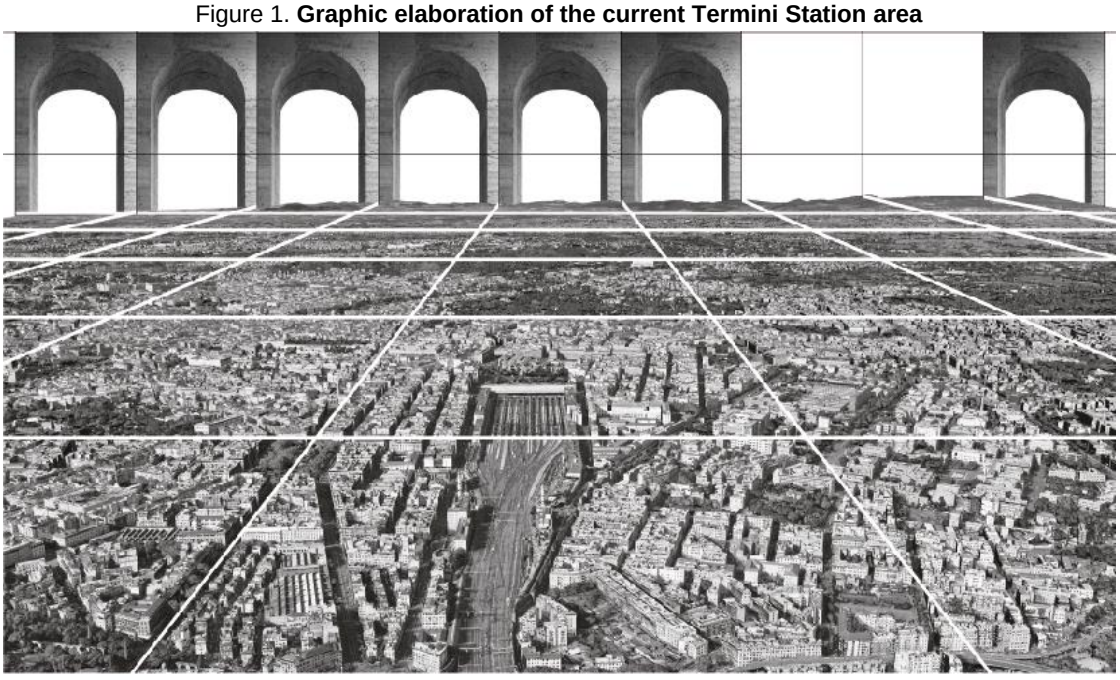
Key words: method; infrastructural nodes; planning

1. The contemporary city and the role of infrastructure

The crisis of the contemporary city, generated by unsustainable growth models, with consequent phenomenon of urban sprawl, has led to a succession of suburbs with low relational intensity, distorting the perception of the urban space. The infrastructure system has always played a fundamental role as the backbone of the city and the territory, being the only level of capillary connection between different areas. The position of the infrastructures (tracks, stations and railway stations), historically inserted in the urban fabric, plays a strategic role in urban regeneration projects, favoured by the effects of the liberalisation of rail transport, launched by the European Community in the 1990s. Liberalisation has in fact introduced a division between transport companies and infrastructure managers, generating stakeholders with the specific task of enhancing rail ownership, which becomes strategic for activating large-scale processes and involving different actors. However, large urban projects are not always capable to guide all the resulting dynamics.

In this article, starting considering the transformability of the contemporary city, we present a methodology based on the strategic priority of the infrastructural intervention, which includes the planning of consequential actions on an increasingly detailed scale, to define an effective regeneration project. The *Mending Termini Station* method was born within an international workshop at the University of Roma Tre, proposed by Prof. Mario Cerasoli and was developed and defined in the master's degree thesis "Railway yards and urban transformations: Mending Termini Station" concerning Rome and the infrastructural node of Termini station.

Figure 1. **Graphic elaboration of the current Termini Station area**



Source: Master's degree thesis of Becchetti A. and Felici F.

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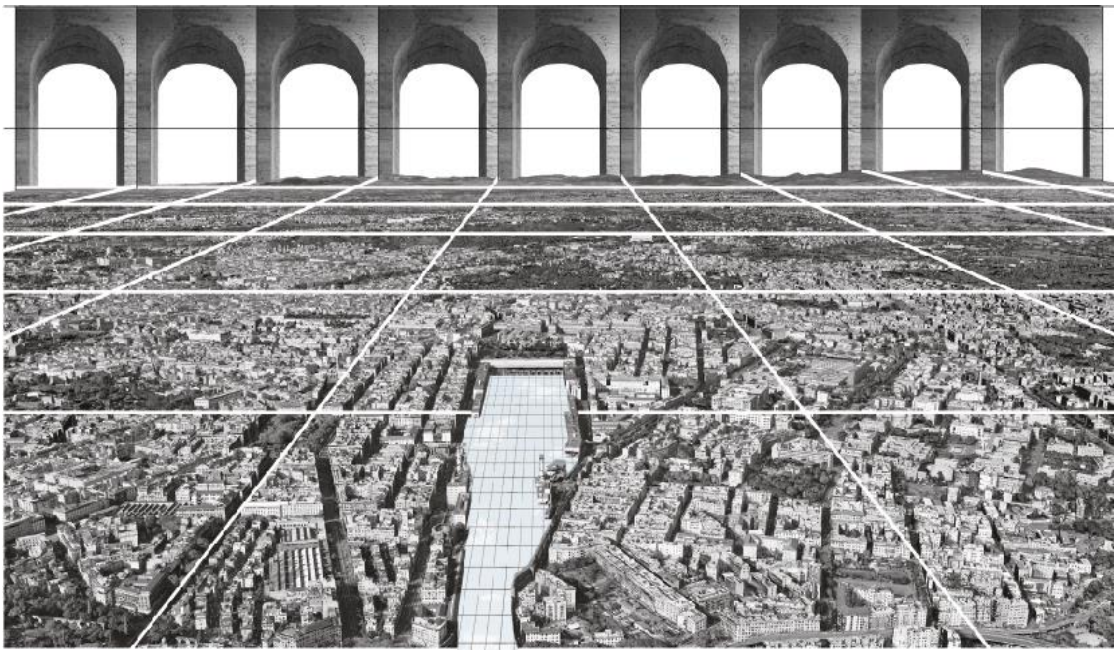
2. The Mending Termini Station method

The methodology applied to the *Mending Termini Station* project comes from the need to define a strategic, multidisciplinary and all-inclusive program, able to provide consequential interventions and to consider essential the social, economic and political dynamics in order to ensure the feasibility and quality of any urban transformation.

In this method, infrastructure plays a key role in initiating this process: all infrastructure construction, improvement or upgrading projects - especially for large works - involve a chain of direct effects on urban dynamics. The inclusion of these effects in a general strategic planning is necessary to direct a complex organism, such as the contemporary city, towards a radical and far-sighted transformation, and to allow the pursuit of the general objectives and the particular interventions.

Therefore, the proposed method is generic and is designed to be adaptable and applicable in different contexts, as long as the preconditions and strategic objectives are common. The main steps of the methodology will be explained in relation to the *Mending Termini Station* project, which is the first complete description and at the same time the first theoretical application of the method.

Figure 2. **Graphic elaboration of hypotetical situation of Termini after the application of the method**



Source: Master's degree thesis of Becchetti A. and Felici F.

2.1 Site-specific analysis and pretext

At the basis of strategic planning, it is necessary to analyse the current context of reference and urban development planning in order to define the possibilities of intervention and the guidelines for transformation, with reference to a polycentric, efficient, sustainable, inclusive and smart city model.

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The *MTS* project is based on the knowledge of the history of the city of Rome and its expansion, mostly chaotic and disorganized. The existing railway and metropolitan infrastructure is not capable of managing the usage load and properly serving the vast urban area, while the surface mobility is suffering from a long inefficient management. This situation brings Rome to the top of European rankings for the use of private vehicles and especially cars, with consequent repercussions on the environment, traffic and travel times. Today, Termini station is one of the major centres and the main infrastructural and transport hub of Rome: with about 480.000 visitors and 850 trains a day, it plays a leading role in the city, regional and national transport system. Since its first construction in 1874, its railway area (about 39 ha) has been an important urban fracture that penetrates the Aurelian Walls inside the historic centre.

Today's station is a complex of buildings in Futurist style, designed by Angiolo Mazzoni in 1937, while the head building (famous competition of 1947) is an acclaimed example of Italian Rationalism. In its historical evolution, Termini had a great improvement and a huge growth, strongly affecting on the transport system of the capital that today is characterized by the unfinished so-called railway ring. On the part existing of the ring, there are trains of regional lines, many of which stop at Termini, while on the eastern part there is the high speed (AV) that always stops at the central station. This is a centralized model of which Termini is the fulcrum, which generates an overload of the infrastructure node and congestion throughout the central area. The large influx of people, combined with the uncontrolled proliferation of commercial, tourist and accommodation functions, even inside the station (large shops, markets, restaurants, bars, terraces and parking lots), has generated both functional discomfort and an urban and architectural degradation of the surrounding neighbourhoods and of the building itself.

The debate on the relocation of the station began at the same time as its first construction, generated by the effects of Termini on the surrounding urban context, and gave rise to several proposals included in the 1931 masterplan (drawn up by Piacentini, Giovannoni and Muñoz). The main content of the plan was the project for upgrading the railway infrastructure, which included the construction of the railway ring, a North-South transversal tunnel and the conversion of Termini into an underground station, transforming the surface area into a new urban centre. Although the project was removed from the plan at the approval stage, the question of the railway ring remained in the intent of the subsequent plans. In 1965 the PRG re-proposed the ring on a different route, in relation to the expansion of the city, but the work has been prolonged over the years without ever seeing the closure. The construction of the last 4 km, provided for by the current PRG 2008, serves as a pretext for the application of the method, making implicit the possibility of redefining the mobility of the capital and opening the way to a multitude of possible scenarios for the future development of the city.

2.2 The method: the intervention on the infrastructure and the possibilities of transformation

The first step in the application of the method is based on the possibility of being part of a planning process that has begun, involving a succession of effects, varying in characteristics and scope, that influence the dynamics of the city. In fact, these options could lead to interventions not subordinated to a general planning, with different degrees of autonomy in urban transformation, bringing improvements limited to the potential of each individual work. The strategic planning provides instead the address of all effects and developments – both

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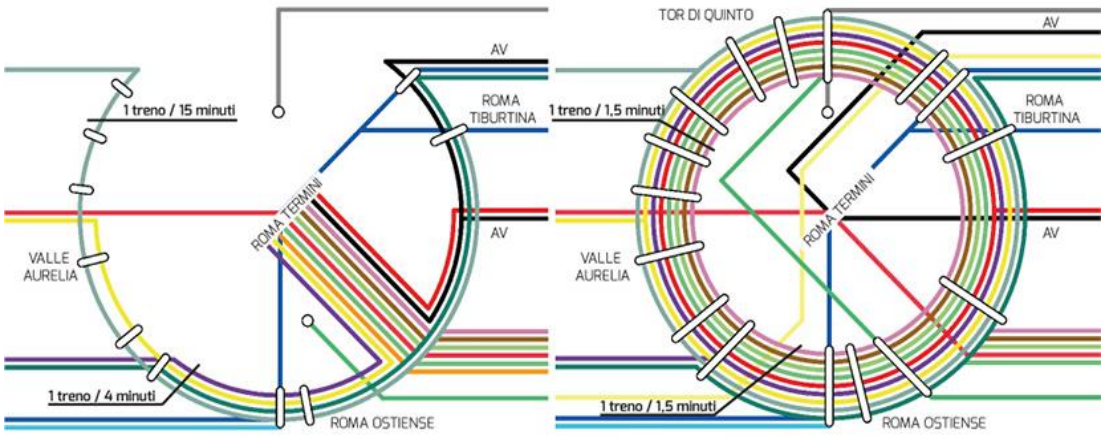
contextual and consecutive - allowing the interventions to have a common resonance, and the pursuit of large-scale objectives.

In this process, the interventions on the infrastructure represent the starting point to plan a consistent renewal of the urban organism: many of the strategic macro objectives for the future city are achievable thanks to the implementation and renewal of the connection infrastructures, mechanisms capable of strongly conditioning the social and spatial dynamics of the city. The *MTS* project links the closure of the railway ring to other projects in the PRG 2008, for example the final project of the Rome Metropolitana (already present in the PRG 2003), allowing the definition of a mobility model, integrated between railways and surface transport, no longer centralized but tangential.

In this new scenario, local and regional trains run on the ring, also providing a metropolitan transport service. All the stations, in particular Tiburtina, Ostiense, Valle Aurelia and the new one planned at Tor di Quinto, act as intermodal interchange nodes with the other public transport systems (metro, tram and trolleybus lines, existing and planned, and main metropolitan road collectors), to which the transversal connection is entrusted. This model would allow a more efficient and appropriate service to the capital (the frequency over the whole ring would reach 1 train every 1,5 minutes compared to the current 15), and to restore that fundamental role in the connection between the city and the territory that stations historically have always had.

In addition, a new infrastructure work is dedicated to the high-speed lines (AV): A North-South underground bypass (taken from the 1931 masterplan) with a single stop at the new Termini underground station. On this new section, AV trains can maintain the maximum speed offered by the network, improving the connection on a national scale, while the historic and iconic building of the station is preserved as the gateway to the capital and at the same time the historic centre and the node of Termini are relieved by the concentrated influx of commuters.
The dismissal of the railway area (about 39 ha inside the historical centre) and the new public and private functions contained in the buildings of the station, allow to define a program of interventions aimed at mending the urban fracture and start a process of regeneration extended to the entire central area.

Figure 3. **Schemes of the railway line of Rome before and after the application of the method**



Source: Master's degree thesis of Becchetti A. and Felici F.

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2.3 The method: procedural scenario

Once the priorities for intervention and the main long-term objectives have been identified, the methodological proposal is implemented by outlining a procedural scenario: a hypothesis of economic and political feasibility, based on the study of the dynamics of interventions of similar importance.

The processes of urban regeneration are often very consistent operations that the public administration finds it difficult to undertake on its own. The integration of regeneration processes with infrastructure investments allows the involvement of stakeholders such as railway companies and other transport companies, capable of making large investments and driven by interesting possibilities for economic development.

In Italy, as in the rest of Europe, railway companies since the 1990s have suffered the consequences of the liberalisation processes launched by the European Community (Directive 440/1991 EEC and Railway Packages). These directives, together with the national regulations that adopted them, led in 1992 to the public economic agency Ferrovie dello Stato becoming a joint-stock company (FSI SpA) owned by the Ministry of Economy and Finance and under the operational control of the Ministry of Infrastructure and Transport. In 2001, Trenitalia, the operator of transport services, and Rete Ferroviaria Italiana (RFI), the infrastructure manager and concessionaire for railway areas (as long as the tracks are present) were created, both companies fully owned by FSI.

Therefore, the *MTS* scenario necessarily implies the definition of a negotiation procedure between the two main subjects involved: RFI and the municipality of Rome (holder of the right to urban transformation and guarantor of the interests of the citizens).

In the hypothesis, RFI would support the construction of the new underground bypass and the new AV Termini underground station, dismissing a significant railway site in a very central area on which it could build a new project with various uses. At the same time, the historic building of Termini station (owned by Grandi Stazioni SpA - FSI Holding) could be enhanced and used for various public and private functions.

In return, the municipality of Rome would allow the transformation of the central railway areas provided the production of a significant portion of public city, the reconnection of districts, the construction of public services and equipment and the overall improvement of mobility is guaranteed. In the *MTS* hypothesis, Programme Agreement (AdP) and participatory planning would be the procedural way to ensure that the transformation of the Termini railway yard leads to a quality project, shared, inclusive and sustainable, while at the same time implementing all the complementary actions necessary for the overall improvement of the central area of Rome and, specifically, urban and metropolitan mobility.

2.4 The method: regenerating the consolidated city

Having defined the priority of infrastructural reorganization and including the programmatic and financial dynamics of planning, it is possible to reach the scale of urban intervention. The *MTS* method is aware of the multiplicity of consequences that a new infrastructural model can generate and therefore, according to the consequences of the interventions, it defines the

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ambits in which all the dynamics active on the territory can converge. The study on which the method focuses starts from a metropolitan scale to converge on the central area but identifies the possibility of intervention with the same principle in other urban areas. The urban redevelopment project starts with the drafting of a general masterplan, in which the macro objectives and specific strategies to achieve them are defined, and then goes down to a detailed level on the planning of the individual interventions that realise the strategies, distinguished by systems:

- Infrastructure and mobility system;
- Settlement system;
- Historical-natural system.

In general terms, the *MTS* intervention has the following objectives:

- Mending urban fractures;
- Reversing the hierarchy of mobility models;
- Protecting the historical and architectural heritage;
- Integrate the archaeological and ecological network;
- Stimulate the use of smart modalities and technologies in city management.

In terms of mobility, the intervention proposes to discourage the use of private polluting vehicles to promote sustainable public transport and soft mobility (pedestrian and cycle). A new regulation of Limitated Traffic Zones (ZTL), the reorganization of the trolleybuses and trams network and the reorganization of the main road aim at an increase in the connections of pedestrian and cycle spaces and at a better environmental and spatial quality.

For the settlement system, the main objective is to improve urban quality, which can be obtained by specific recovery plans and maintenance of the buildings. In this setting, the redevelopment of public space plays a strategic role in stimulating a more extensive process.

Finally, the intervention on the environmental system proposes the definition of four new linear parks - two planned by the PRG and two by the project - which connect the existing punctual green areas, the archaeological and monumental areas and the large urban parks. In addition, the restoration of the roadside trees, on the great 19th century roads that cross the historic centre, contributes to creating an integrated ecological network that connects the green areas and makes the public space more usable and liveable in terms of climate and perception.

2.5 The method: new possibilities of urban regeneration

Having defined and addressed the possible consequences, an urban context has been defined that can allow a new regeneration intervention, moving down to a specific design dimension depending on the part of the city in which it is inserted.

The possibility of regeneration is closely linked to the identification of potential areas, not so much for their size but for their central location in the urban organization, connected or modified by the infrastructural intervention, which offer the opportunity to imagine new interventions that unite parts of segregated cities, provide space to increase the supply of services and green areas of the central areas (saturated but not adequately equipped) and allow the inclusion of those emerging functions (managerial and commercial) able to redefine the polarities of the consolidated city.

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These can be pre-existing urban voids, railway areas that change or lose their infrastructural functions, or transport nodes (railway and underground stations and large interchange nodes) together with the public spaces connected to them. Also, in this case, the *MTS* elaboration is only one of the possible regeneration projects allowed by the strategic planning of the city.

The *MTS* project on the Termini ex-railway yard mend the urban fracture by increasing the number of services and diversifying the housing offer. At the same time, the involvement of private stakeholders (in this case RFI) requires planning that balances investment with adequate returns. Therefore, the distinction between public and private spaces has been dictated by a calculation of the percentages of services and green areas, needed for the entire surrounding area, and the margins of interest that RFI could derive from the sale/rent of private properties, including the new functionalisation of the Termini station building. The new subdivision respects the main alignments of the adjacent districts and takes over the types and sizes. The functions introduced determine stylistic articulations ranging from linear and monumental (executive and administrative buildings) or freer and more innovative (auditoriums) to more closed, compact and decomposed that generate access or allow the passage of avenues and driveways (students, social housing and mixed commercial housing). The public spaces are designed to recreate spaces appropriate to the human dimension, connect with the context and build views and perspective visions that give the intervention its own identity and recognizability. The new AV line runs about 40 metres below ground level (below line A of the Metropolitana), while the ascent culminates in the first basement floor of Termini station, moving the heart of the new metropolitan hub into an underground square that accommodates all travellers. The station building maintains some of its administrative functions, but is even more open to commercial and services, restoring the original visitability of the driveway gallery and the head building.

The introduction of new services but mainly of public spaces (squares, pedestrian and driveway streets, green areas and urban parks) is due to the need to guarantee the urban standards to the future inhabitants of the area but also to increase the supply for the inhabitants of the historical centre and of the districts involved in the intervention, guaranteeing the development of an important portion of the city.

Figure 4. **Urban regeneration project on the Termini ex-railway site**

Source: Master's degree thesis of Becchetti A. and Felici F.

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3. Processes that evidenced the method

The *MTS* method is the result of a critical reading of three international projects that constitute both references and evidence of the method itself. These experiences concern strategic programmes that can be considered complete in the practical application of the aims of the strategic programmes, despite the fact that investments and transformations are still underway. The study of these three processes is due to the similarity of their strategic objectives and to a consequentiality of actions, starting from the infrastructure to the regeneration of large urban areas. The intervention on the railway system is the basis of all the case-studies, inserting the planning and subsequent designs in a broader and longer-term vision.

One example is the Maine-Montparnasse project in Paris, a process that has been evolving for over eighty years and which is still able to promote and catalyse urban development and interests. Already in 1932, through an agreement between the municipality and the Societé Nationale des Chemins de Fer (SNCF), the 19th century station was to be drawn back and the free land transferred to the railway company. The European tendency to reduce the impact of railways within the city was linked to the high consumption of land, which prevented new urbanisation in the central districts, but its implementation was only possible after the Second World War. The first interventions on Montparnasse are contextual to other projects, such as the decommissioning of Orsay station, aimed at creating a multi-centre urban system improving the living conditions of the most degraded quarters. Between the 50s and 70s, the station was replaced by a large square and an office tower (Tour Montparnasse), backward and enclosed within three buildings with offices and a thousand apartments.

A second phase of the transformation, which began around the 80s, planned the implementation of the entire Parisian infrastructure system, starting from a new tangential motorway system. An agreement between the city council of Montparnasse and the SNCF brought the TGV Atlantique into the city, making the junction of national importance and producing a series of regeneration and recovery interventions throughout the district. The station played a key role in the transformation, being the first to develop an office modernisation project and a new 3,5 ha urban park above the tracks. The positive effect of the increase in new public and private functions has made Montparnasse an innovative, sustainable, technological and strongly identifying pole, destined to become the new centre of the South-East part of Paris. With the arrival of the high speed lines in 2010, a new phase of long-term development was defined, divided into time steps:

- in 2020 the construction of the new îlot Gaîté - which includes a shopping centre and new public services;
- for 2024 the renovation of the Tour Montparnasse, which will contain offices, apartments, a hotel, start-ups, cafés and restaurants.

All these consequential projects start from the concept of the evolution of the city through the infrastructure, started with a project on the railway station and continued with the implementation of the interventions on the intermodal node. The continuous investment in this area, which is part of a wider debate on Parisian mobility, has allowed not only the provision of equipment and public services to a historic district that was lacking, but also managed first to heal the fracture - and the consequent urban degradation - and then to promote a new urban polarity.

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The revitalization of unexploited or degraded areas is the basis of the second process examined. The Camden district is located within the confines of the City of London and has always been an area characterized by the presence of numerous activities and industrial structures. After the Second World War these industries began a period of decline, with subsequent abandonment of structures and removal of the railway lines serving. Despite some gasometers remains in operation until the 2000s and some punctual redevelopment actions was developed, in the early 90s, the area was in a state of underutilization and neglect, so as to bring back the lowest rents in central London. It was in these years that the city began a process of renewal of its infrastructure system.

For the area between the two main stations in the district - St. Pancras and King's Cross - the London Regeneration Consortium (LRC) presented proposals for the development of railway land early in 1989, in 1994 the London Borough of Camden declared itself "willing to grant" planning proposals. When it was decided in 1996 to build a new link from St. Pancras station to the Channel Tunnel (the Channel Tunnel Rail Link, concluded in 2003), the area attracted the interest of private investors and of the municipality. Starting with the recovery and improvement of the stations themselves - with the transfer of the London terminal of the Eurostar - and through the general plan drawn up by the municipality of London (Greater London Authority and Government Office of London), the private developers of Argent Group PLC have started the project of a new hub for mixed use, enhancing public spaces as a priority. By identifying resulting railway spaces - following the reorganization of mobility - the King's Cross Central project has defined 10,5 ha of open space and 10 new public parks and squares, residential buildings, offices and a globe theatre made from one of the old gasometers, as well as a functional and social mix to ensure an improvement in urban life and economic development of the area. The definition of the surfaces in terms of *total permissible land* represents an aspect of great innovation of the project. Providing about 20% of the buildable surface with more flexibility - with functions that can also be defined during construction - ensures an adequate economic gain for investors, making the project more adaptable to market changes. At the same time, the maintenance of the limits of height, density, scale of elements and, above all, the provision of services and areas used for public parks, mean that the area around King's Cross station is characterised by high urban quality and represents a model of reference.

Also, in the 90s in Italy, the railway system was progressively updated, with a general restructuring of the lines and the shifting of logistics activities to large sites. These factors, together with the progressive competitive use of road freight transport, led to the underutilization and disuse of many railway systems, including the seven yards of Milan: Farini, Greco, Lambrate, Porta Romana, Rogoredo, Porta Genova and San Cristoforo. These represent 120 ha of areas disposed in close connection between centre and suburbs, but at the same time they are great fractures in the urban tissues. Despite these dynamics, the effects of the liberalization of rail transport were slow to reach Italy and, as a result, there was no debate on the reuse of disused railway areas in Milan.

Only in 2005, the need to integrate urban regeneration with rail development led to a debate on the achievement of a Programme Agreement between the public and private sectors. The three protagonists of the AdP are the municipality of Milan, the Lombardy Region and FSI. The procedure and the debate on the reuse of the railway yards lasts for ten years when the international event Expo 2015 promotes the image of a dynamic, international city, with a high quality of life and able to manage major transformations.

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In 2016, the AdP was signed, including a Strategic Vision Document included in the Territorial Governance Plan. The municipal administration and the regional council gave RFI the opportunity to transform the railway station areas on condition that the levels of public services and green spaces are protected and increased. In addition, it is established that the profit generated by the new urban developments will be reused in the strengthening of the infrastructure system, the Circle Line is born. The planning of this new tangential infrastructure, electric and surrounded by green spaces is the catalyst project that marks the evolutionary trend of the city and of the yards.

The Seven Yards of Milan strategy is divided into five points that define the macro objectives to be achieved to make Milan a smart city, with a program of over ten years able to attract many stakeholders and produce a resonant effect over time, not only on neighbouring districts or cities, but throughout the country.

In the specific interventions, the AdP provides for the request of participation of the population at every stage of the process in order to reach a meeting point between proposals and economic availability. The involvement of citizens shows a great interest in the needs of individuals and communities. Proof of this is the new system of parks, developed thinking of greenery as the driving force behind change and the functional and typological mix of new buildings:

- more than 65% of the 1.247.605 sm affected by the transformation process, will be used for equipped green services and public spaces;
- in particular, the yard of San Cristoforo will become a large metropolitan park of 140.199 sm (100% of the surface);
- the new districts provide for the integration of the productive, commercial, tourist/cultural and residential systems, each with its own vocation (fashion district, university, etc.);
- residential solutions will be created for each social group (university students, young workers, middle-class families), dedicating a substantial portion of residential construction to social-housing and conventional rents.

The process is still in progress but the new centralities and the competitions for the new ones have already found a global interest, elevating Milan to a new centre of modernity, architecture and environmental sustainability.

Figure 5. **Maine-Montparnasse, King's Cross Central and Scalo Farini project**

Source: paris.fr, aecom.com and oma.eu

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4. Experimentation/application of the method

The development processes of Maine Montparnasse, King's Cross Central and Seven Yards of Milan reflect exactly the consequentiality of the interventions and the ambits of application of the *MTS* method, but currently the approaches to urban and infrastructural regeneration are multiple and can be very different from the guidelines expressed by the method.

The evolution of the *MTS* research has led to its experimentation in two international contexts, different from the models that inspired its definition, but comparable in terms of the aims and consequences of the interventions. Despite the differences, it was possible to apply part of the method to these processes, to promote an alternative scenario - compared to the original planning – and demonstrating the better quality and effectiveness of the results.

In Amsterdam in 2017, on the occasion of the congress *De Menselijke Stad - De invloed van openbare ruimte op ons gedrag* organized by Goudappel Coffeng - adviseurs mobiliteit, urban transformations, and in particular the Zuidasdok project, were discussed. Amsterdam Zuid station is located on the edge of the Zuidasdok district populated by 138.000 inhabitants and covering 17 skm, specifically in the area of Zuidas, a business district where the headquarters of multinationals such as ABN-Amro and Akzo Nobel are located. In addition, the presence of the World Trade Center makes this the economic centre of the city. The node has a considerable strategic importance in the transport network of the city, especially for its proximity and direct connection to the airport of Schiphol. The railway site is sided by a section of the tangential motorway A-10, that makes the Zuid node a barrier to the continuity of the district.

The Zuidasdok project is a large-scale, long-term project that has established the objective of increasing the accessibility of the district, looking ahead to the expansion of Zuidas and considering the current overload of the station. To achieve this goal, priority was given to the infrastructure system, by providing:

- The undergrounding of the stretch of motorway that runs alongside the railway site;
- The reorganization of two railway junctions converging at Amsterdam Zuid node;
- The extension and renovation of Amsterdam Zuid station.

These projects, which are consistent in terms of both cost and strategy, are supported by all companies and public bodies - operators or guarantors of the functionality of public transport - which ensure their effectiveness on the basis of a programmatic agreement. By placing these infrastructural transformations at the base of the requalification of the whole area, new possibilities of intervention arise linked to the implementation of basic public services (green areas, car parks, pedestrian areas) which are expressed in the redesign of the public space close to the station.

As in the other cases, it can be noted that the achievement of a general objective is conditioned by the consequentiality of the intervention phases, organized under the supervision of an agreement between public authorities and private stakeholders. Nevertheless, the programme is still in an analysis phase and the design of a new station may not heal that fracture in the area, which is currently one of the most influential problems. Precisely in this gap has been found the margin to implant the *MTS* method.

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The expansion of the station - possible after the burial of the motorway sections - will make it the fifth busiest in the Netherlands, thanks to the connection with the high-speed network Thalys that will connect Amsterdam Zuid to German and Europe, creating an intermodal node of national importance. The proposal resulting from the application of the method involves burying the entire railway station, bringing the sections of the A-10 to an even lower level, without affecting the extension of the tracks and of the station. This type of intervention refers to the *MTS* project for the conditions that allow its economic and urbanistic feasibility, and to the implicit developments of the surrounding area. In fact, the underground station makes it possible to recover space overground, mending the interrupted continuity in a neighbourhood that is expected to be a new urban polarity.

The area of Zuidas - mainly financial and tertiary - risks being mono-functional and not lived out of office hours, but this availability of space at urban level has allowed a more flexible and functional scenario, consisting of a system of green areas and sports centers, integrated with new punctual architectural projects for public services, which emphasize the architectural characteristics of the new expansion.

In 2019, the development of the *MTS* method was the basis for the regeneration of public spaces around the Roissypole station, in the area of the Charles de Gaulle international airport in Paris. The project was presented at the *Play your airport - saison 2* ideas competition, organised by Groupe Aéroports De Paris, and the work presented resulted as winner in the category New urban development, demonstrating the effectiveness of the method and the flexibility of application in partially different contexts.

Roissypole railway station is located within the CDG airport complex, the second largest airport in terms of international passenger flow (65,5 million passengers/year and 188 flight/hour). The entire airport hub is located about 40 km from the city centre, and connected with the subway line B and the RER railway line, through Roissypole station (4.768.200 passengers/year), located exactly in the middle of the three terminals of the airport. The district is an administrative and managerial centre, with the presence of the headquarters of Air France and ADP Group, as well as an intermodal infrastructure node (airplane, train, metro and bus and private vehicles).

Connect 2020 is the ADP Group's strategic plan for 2016-2020, which aims to renew not only the airport structures and infrastructures but also the technological, IT, transport and environmental sustainability aspects. For the concomitance with the plan *Paris smart and soustainable. Looking ahead to 2020 and beyond* and in view of the 2024 Olympics, CDG has the objective of becoming the main airport at national and international level for the transport services. Considering therefore *Connect 2020* as the intervention on the infrastructure of the wider program dictated by the city of Paris, we can find again similarities with the contents of the method.

In addition, the ADP Group and the main actors present in the area (Air France) actually play the role of stakeholders. This strategic plan for Roissypole is currently underway, and is working on infrastructure and reversing trends focused on environmental sustainability and telematic connection. Considering the progress of the strategic plan, it is therefore possible to start working on those urban regeneration projects aimed at increasing the number of services and the quality of life.

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Figure 6. **Zuidasdok project and Sharedspace – Relate – Development project**

Source: zuidas.nl and Project for “Play Your Airport – season2” international contest Becchetti A., Felici F. and Pusceddu A.

Even if the *MTS* method was only inserted at the end of the transformation process, it was still able to enhance the expected results. The call for entries required the design of two squares in front of the Roissypole station (already under restoration), without specific guidelines apart from limits on volume and dimension of new buildings. The squares, without architectural and community identity, were in a state of partial disuse and were unable to satisfy the needs of workers and passengers. The winning peculiarity of the *Sharedspace - Relate - Development* project was to understand that problems related to a space do not depend only on the space itself, but also on its context. After an analysis of the main functions present and missing in the area, a masterplan of the entire district was developed, which provided for specific interventions and new functions, connected by the spatial continuity of green areas and pedestrian paths. In a second phase, the focus was on the two squares - Place Cartier and Place Magellan - in which the guidelines of the masterplan became more detailed and the projects of two exhibition/functional pavilions took shape, contextual to a general renewal of floors, paths and green areas. The project ends with the elaboration of a marketing plan and the organization of annual events in the two areas, to justify the realization and effectiveness of the interventions. In the final round, when compared with projects limited to a single building (even if with innovative functions), a project that included the real needs of those who live in the area was more convincing and capable of increasing the quality of life even for the areas not involved in the competition, a model to follow for the regeneration of the entire district.

In this case, the consequentiality of the interventions is not attributed to the application of the method, but to the organisational and management capacities of the municipality of Paris and ADP Groupe. However, the implementation of the method at its projectual scale has shown that the design of an all-inclusive project specifically placed in the context, with particular attention to social and environmental aspects, is the most desirable solution for achieving the objective of the city of the future.

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5. Conclusions

The method exposed is still the central theme of a research in continuous progression. The possibilities arising from its applications have enabled reflections on related and implementable issues, in order to achieve an increasingly high degree of completeness of the method itself, and to direct all variables related to urban development, towards a common goal. Adopting a planning strategy becomes necessary to initiate a radical process of urban renewal. In order for the city of the future to become effectively polycentric, sustainable and interconnected, it is necessary to reverse the tendency to operate by parts, promoting a unified development program to achieve the macroscopic objectives that can provide and manage the particular needs. In this perspective, the infrastructure can be considered not as a functional element and an obstacle to urban expansion, but as its main line of development, reinterpreting the signs left in the complex city organism as the circulatory system capable of connecting and regenerating all its parts.

Author's contributions: Becchetti A. and Felici F. developed the thesis "Railway yards and urban transformations: Mending Termini Station" presented in 2018 at the University of Roma Tre and have participated in the congress "De Menselijke Stad - De invloed van openbare ruimte op ons gedrag" as consultants, Pusceddu A. was the co-supervisor of the thesis "Railway yards and urban transformations: Mending Termini Station", Becchetti A., Felici F. and Pusceddu A. developed the winning project in the international competition "Play Your Airport - season 2" and are the authors of this paper unanimously.

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