
TIBERCONNECT

TiberConnect: Turning the Tiber into Rome's Green Transport Corridor

Eleonora Andreoli, Filippo Angiolini, Victoria Grace Fiumi, Caterina Morganti, Vittoria Marino, Chiara Sena, Valerio Spiniello
Students from the MSc Transformative Sustainability - Joint degree Università Commerciale "Luigi Bocconi" with Politecnico di Milano - in partnership with BCG

Introduction..... 2
Our idea..... 2
Other successful examples..... 2
The project..... 2
The five stations..... 2
Service schedule and features..... 3
Catchment Area..... 5
Load Factor..... 5
Costs and time..... 6
Fleet CAPEX and annual operating-cost estimate..... 7
Financial model and consolidated economic analysis - a Public-Private Partnership..... 9
PPP Structure..... 9
Consolidated economic analysis..... 9
Timeline of the project..... 10
Conclusion - Why invest in TiberConnect?..... 11

Introduction

Rome was one of the first cities that came to mind when we started thinking about urban mobility. As the capital of Italy, one of the most beautiful cities in the world, and a primary destination for tourists, it is nevertheless affected by a critical challenge in terms of mobility and urban transportation. Our mission is to transform an underutilised resource into a new transport infrastructure capable of connecting different areas of the city: the Tiber River.
Rome's growing population is placing increasing pressure on limited urban space and an already congested transport network. In 2025, average road congestion reached 45.2%, with drivers losing 115 hours a year in rush-hour traffic. The imbalance between transport modes is substantial: approximately 4.16 million daily trips are made by car or motorbike, compared with 0.93 million by public transport. At the same time, the 13.6 million shared-mobility rentals recorded in 2024 point to demand for alternatives to private vehicles. TiberConnect responds by using the Tiber, an underutilised corridor through the city, for a public transport service open to residents, commuters, students and visitors.

Our idea

Although several boat services already operate on the river, they are designed exclusively for tourists. Our goal, instead, is to create a service for residents: a mode of transport that Romans can rely on in their daily lives to commute to work, travel to school, or attend appointments across the city. The project aims to give the Tiber back to the people of Rome by creating two transport lines stretching from Ponte della Musica, in the northern part of the city, to Ponte Marconi in the south, providing a credible alternative to private cars and congested public transport. We have identified nine potential locations along the Tiber that would be suitable for this project, including Ponte Milvio/Foro Italico, Ponte Cavour, Ponte Sisto, Ripa Grande, Ponte dell'Industria, and Ponte Marconi. However, our pilot phase would start from five stations, and then, there will be the possibility to add more stops in other parts of the Tiber.

Other successful examples

While studying how to implement our idea in the complex environment of Rome, we took inspiration from other European cities that have already successfully implemented a fluvial transport system. Each of the three water transport models we studied offer a different lesson for Rome. Amsterdam's GVB ferries demonstrate the value of treating water transport as an accessible public service, designed around everyday mobility needs and integrated into the wider transport network. Venice illustrates how differentiated fares can keep the service affordable for local users while capturing additional revenue from visitors. London's Uber Boat by Thames Clippers provides an example of how a private operator can deliver a river service within an integrated public transport system.
TiberConnect combines these approaches through frequent, accessible connections for residents and commuters, distinct fares for local users and tourists, and a long-term public-private partnership in which Roma Capitale sets routes and service standards while a private partner designs, operates and maintains the system.

The project

The five stations

The pilot phase would begin with five stations: Ponte della Musica, Ponte Cavour, Ponte Sisto, Ripa Grande and Ponte Marconi. These locations were selected because they are the most accessible and best suited locations to Rome's residents' daily mobility needs. The river transport service would connect the northern part of the city with the centre and the south, allowing passengers to avoid the congestion that affects both road traffic and bus services every day. Moreover, all the stations are well integrated with the existing public transport network, making them easily accessible for passengers. The first station, Ponte della Musica, would serve as the northern gateway of the project and would significantly support the large

number of people who regularly travel to the area due to the presence of the Olympic Stadium. Major events such as concerts and football matches frequently overload the public transport system in northern Rome, and this new transport option would help alleviate that pressure. Furthermore, the site is highly accessible, and construction activities would be relatively straightforward, particularly because the area has already been identified for redevelopment. The second station would be located at Ponte Cavour and would serve three main categories of users: commuters, thanks to the concentration of law firms and the presence of the Palazzo della Giustizia, and numerous office buildings; tourists and visitors interested in the city's cultural attractions; and residents simply looking for a faster alternative to congested roads. The station would be located on the Palazzo della Giustizia side of the river, as this location provides better connections to the densely populated Prati district and offers more direct access to existing riverfront infrastructure.
The third station would be in Ponte Sisto, the bridge immediately before Tiberina Island, which cannot be navigated. For this reason, the North Line will stop here, and it will be efficiently connected with the first station of the Southline, after Tiberina Island: Ripa Grande. Both of these two stations are going to be located at the left side of the Tiber. People will have multiple ways of going from Ponte Sisto to Ripa Grande: we plan to create a bike station in front of the wharf, but also an electric shuttle service will be provided for accessibility reasons.
Finally, the last station would be located at Ponte Marconi and would represent the operational southern terminal of the line. It would provide efficient access to key destinations such as the Basilica of San Paolo fuori le Mura, the Metro B station Basilica San Paolo, Roma Tre University, Ostiense, and the Marconi district. In addition, the nearby Tiberis area represents an ideal location for the station, as Roma Capitale is already redeveloping it into a permanent waterfront park.
Designed to be integrated with metro, bus, cycling and walking networks, the service would provide an additional mobility option while incorporating step-free access through ramps, lifts and floating pontoons that adjust to changes in river level. Its modular design lays the foundations for future growth, with the potential to bring the model to our cities with underused waterways.

Service schedule and features

The service will operate continuously from 6:30 a.m. to 9:00 p.m. for an estimated 350 days per year. This estimate is based on the average number of days on which the Tiber was not navigable over the past five years.
Service frequency will vary between peak and off-peak hours. The table presents a preliminary schedule based on weekday frequencies of other public transport services in Rome. Time slots will be adjusted after implementation in response to actual passenger demand.

Time	**Frequency**
6:30 a.m. - 7:30 a.m.	15 minutes
7:30 a.m. - 10:00 a.m.	10 minutes
10:00 a.m. - 12:30 p.m.	15 minutes
12:30 p.m. - 2:00 p.m.	10 minutes
2:00 p.m. - 5:00 p.m.	15 minutes
5:00 p.m. - 8:00 p.m.	10 minutes
8:00 p.m. - 9:00 p.m.	15 minutes

Ticket prices will also vary by passenger category: residents and students will pay a lower fare than non-residents, while ATAC annual and monthly pass holders will pay only an

additional fare. A 24-hour Tiber Experience pass will also be available, primarily for tourists. Further pricing details are provided in the table.

Ticket category	Price
Roma resident ticket	€ 1.50
Student ticket	€ 1.00
Non-resident ticket	€ 4.00
Tiber Experience 24h pass	€ 15.00

The five proposed stations are located near existing public transport corridors, extending the service's reach beyond the Tiber. The north line would connect with tram, bus and Metro Line A services at Ponte della Musica, Ponte Cavour and Ponte Sisto. The south line would provide links to buses, trams, Metro services and rail connections at Ripa Grande and Ponte Marconi. These interchanges would allow passengers to combine river travel with other modes of transport to reach a wider range of destinations.
To assess the service's travel time competitiveness, we compared journeys along the full route by river, car, bicycle and bus. The river journey is estimated to take 56 minutes to one hour including waiting time. This is faster than the 1 hour 14 minute bus journey without changes. Cycling takes approximately 33 minutes, while driving takes 18-45 minutes, depending on traffic. Drivers would also need to allow time to find parking. Road, cycling and bus times are based on Google Maps estimates for a journey at 8:00 a.m. on a Monday; river times are based on the project's operating assumptions.
TiberConnect is also intended to be integrated into ATAC's mobility platform under the Mobility as a Service (MaaS) model, which brings different transport options together in a single digital service for planning and accessing journeys. Alongside bus, tram, metro and rail, the river service would appear in door-to-door itineraries and combinations of transport modes. Passengers could compare routes and view each leg's travel time, walking distance, transfers and estimated CO_2 emissions, helping them choose the option that best meets their needs. Tickets and passes could also be purchased and accessed through the same platform.

Means of transport

Our objective is to collaborate with the advanced company TEMA to develop a vehicle specifically designed for the characteristics of the Tiber: fully electric and compact enough to navigate the river's narrower and more challenging sections.
We propose a fleet of small electric boats designed for everyday travel. Our starting point is *Magenta*, a sightseeing boat that carries up to 60 passengers on the Danube in Vukovar, Croatia. It is 15 metres long and 5.6 metres wide, has an aluminium hull, and can reach nine knots. The Italian company TEMA supplied its two 30 kW electric motors. Each motor has a 63 kWh battery, giving the boat 126 kWh in total. Ten solar panels on the roof add 3.5 kW of peak power. According to TEMA, *Magenta* can operate for up to ten hours without charging when its motors run at low power. We would commission TEMA the development of a very similar vessel in terms of features and dimension for Rome, with the addition of the equipment that supports fast charging. The cabin would be enclosed, heated and air-conditioned so that passengers could use the service in a comfortable way throughout the year.
Each boat would have step-free boarding, spaces for wheelchair users and an area for bicycles. A qualified skipper and a second crew member would assist passengers and manage boarding. These features would make the boat suitable for residents travelling to work, school or appointments, as well as for visitors. At an estimated service speed of seven knots (about 13 km/h), the northern line would travel from Ponte della Musica to Ponte Sisto via Ponte Cavour in 21-23 minutes in each direction. The southern line, between Ripa Grande and Ponte Marconi, would take 16-19 minutes in each direction. Our timetable allows five minutes at each stop for passengers to get on and off and, where the equipment permits, for

a short battery charge. Including these stops, a boat would complete a return trip in about 60 minutes on the northern line and 45 minutes on the southern line.
During busy hours, a boat could leave each end of each line every ten minutes. This would require 12 boats in service: seven in the north and five in the south. At quieter times, a departure every 15 minutes would require nine boats. Two further boats would be kept in reserve, bringing the proposed fleet to 14. With 60 places on each boat, a ten-minute timetable could offer up to 360 places per hour in each direction on each line; a 15-minute timetable would offer 240.
The fleet would be moored and charged at two depots, placed at the end of each line. Each depot would have 22 kW AC chargers for overnight charging and 150 kW DC chargers for faster charging during off-peak service hours. Boats would take turns charging so that scheduled departures could continue. A 22 kW charger would take around 12 hours to recharge a nearly empty battery, while a 150 kW charger could restore roughly 60% of the proposed battery capacity in about 1-1.5 hours. Fast chargers at selected stops would also be available when an unscheduled charge is needed. The northern depot, at Ponte Sisto, would have mooring space for eight boats (seven for service and one reserve) along with eight slow chargers and five fast chargers. The southern depot, at Ponte Marconi, would accommodate six boats (five for service and one reserve) with six slow chargers and four fast chargers.

Catchment Area

ISTAT 2021 data processed using QGIS was used to estimate the population within the catchment areas of the proposed TiberConnect stops. A 15-minute walking isochrone was generated for each stop to estimate the number of residents, students and workers living or working within walking distance of the service. The analysis identified 136,463 residents and 43,326 students, with an assumed 20% overlap between students and residents. For simplicity, the estimates do not adjust for overlap between catchment areas. The worker analysis distinguished between people who live and work within the same catchment area, people travelling between different catchment areas, and workers commuting to them from the Rome metropolitan area. Of an estimated 100,000 inbound workers, 50% were assumed to travel along the corridor, resulting in approximately 50,000 potentially relevant workers. The assumption was informed by an origin-destination (OD) matrix map generated using ISTAT 2011 data, the most recent publicly available dataset identified for this analysis. These estimates produced a total potential population of approximately 220,000 people, excluding tourists. The resulting estimates formed the geographic basis for defining TiberConnect's potential user base.
Using the shares of people travelling by different modes reported in Rapporto Mobilità Roma 2025, alongside assumptions about potential uptake of TiberConnect, a target audience of approximately 71,500 people was estimated. This includes 11,000 public transport users (5% of the total population), 27,500 people who walk or cycle (half of the 25% using these modes), and 33,000 car or motorbike users (25% of 60% using these modes). These figures indicate how many people could potentially use TiberConnect under these assumptions, it is not an estimate for how many passengers the service is expected to carry.

Load Factor

The load factor was estimated through a demand-based approach based on the analysis of the catchment area. Starting from an addressable user base of 71,500 people, and using the average mobility rate of 2.5 trips per person per day given by Rapporto Mobilità Roma 2025, the potential market corresponds to approximately 178,750 daily trips. Since 27.1% of trips in Rome are systematic work or study-related journeys (Rapporto Mobilità Roma 2025), this result is about 48,441 systematic trips per day, assuming one outbound and one return journey per regular user, this corresponds to approximately 24,220 potential daily systematic users.
Three demand scenarios were then developed by applying capture rates of 15%, 22% and 29.5%, resulting in approximately 3,633, 5,330 and 7,145 daily active users, respectively. Assuming that each user makes 2 journeys per day and travels an average of 1.5 river

segments per journey, daily demand reaches between 10,899 and 21,435 passenger-segments depending on the scenario. Comparing these values with the network capacity of 25,920 seat-segments per day produces load factors of 42% in the conservative scenario, 62% in the base case and 83% in the optimistic one.
To estimate revenues, the availability seat-segment capacity is converted into passenger-journey capacity using the average 1.5 segments per journey and multiplied by the respective load factor. Over 350 operating days per year, this result corresponds to approximately 2.54 million, 3.75 million and 5.02 million annual passenger journeys. Applying a weighted average ticket price of €1.987, based on the expected mix of passenger categories, generates an annual ticket revenues of €5.05 million, €7.45 million and €9.97 million, respectively.
Tourist demand is deliberately excluded from the estimation, meaning that the analysis reflects only regular resident, worker and student mobility and doesn't incorporate potential additional tourism related revenues

	CONSERVATIVE	BASE	OPTIMISTIC
Catchment area	71,500	71,500	71,500
Daily active users	3,633	5,330	7,145
Journeys per user per day	2	2	2
Average segments per journey	1.5	1.5	1.5
Passenger-segments per day	10,899	15,990	21,435
Seat-segments per day	25,920	25,920	25,920
LOAD FACTOR	**42%**	**62%**	**83%**

	CONSERVATIVE	BASE	OPTIMISTIC
Passenger segments per day	(25.920/1.5)*0.42 = 7,257.6	(25.920/1.5)*0.62 = 10,713.6	(25.920/1.5)*0.83 = 14,342.4
Annual passenger journeys (350 days)	2,540,160	3,749,760	5,019,840
Average ticket price*	€1.987	€1.987	€1.987
Annual ticket REVENUE	**5,047,298**	**7,450,773**	**9,974,422**

Costs and time

Component	Ponte della Musica	Ponte Cavour	Ponte Sisto	Ripa Grande	Tiberis	Total
Preliminary surveys, bathymetry, geotechnical assessment, underground utilities, and site preparation.	0.15	0.20	0.25	0.25	0.20	**1.05**
Pier, gangway, piles/anchors, fenders, bollards, and marine structures	1.10	1.05	1.10	1.10	1.05	**5.40**
Waiting area, lightweight canopies, bike hub, furnishings, and technical room	0.18	0.18	0.22	0.20	0.52	**1.30**
Lighting, CCTV, SOS, PA, ticketing, and passenger information	0.22	0.22	0.22	0.22	0.24	**1.12**

Electrical power supply and shore power	0.08	0.08	0.08	0.08	2.20	**2.52**
Direct work	**1.73**	**1.73**	**1.87**	**1.85**	**4.21**	**11.39**

Analytical estimate of the work values in millions of euros, 2026 prices, excluding VAT

Component	**Cost**
Direct work	€11.39 M
Design, construction supervision, safety, inspections, permitting, acceptance testing, and project management – 15%	€3.13 M
Technical and permitting contingency – 20%	€4.11 M
Inflation up to the project midpoint – 9,5%	€1.97 M
Total CAPEX	€20.6 M

Transition from construction costs to the actual budget

The 20% contingency is important because the project is at a stage prior to the PFTE (Technical-Economic Feasibility Project) and involves hydraulic, archaeological, landscape, and electrical connection risks that have not yet been quantified.
The following figures also include the allocated portions for design, contingency, and inflation.

Station	**CAPEX**	**Probable range**
Ponte della Musica	€3.13 M	€2.49–4.00 M
Ponte Cavour	€3.13 M	€2.50–4.03 M
Ponte Sisto	€3.38 M	€2.66–4.43 M
Ripa Grande	€3.35 M	€2.61–4.43 M
Tiberis/Ponte Marconi	€7.61 M	€6.02–10.89 M
Total	€20.60 M	€16.3–27.8 M

Complete cost per station

Fleet CAPEX and annual operating-cost estimate

The estimate starts from the approximately €1 million price indicated for the Danube Magenta, but it does not assume that TEMA could deliver a public-transport-ready version for the same price. The original vessel was launched in 2015 and is an open sightseeing boat, whereas the Tiber Connect version would require a more enclosed passenger cabin, climate control, public-transport equipment and potentially a larger battery and propulsion system.

Item	**Central estimate**	**Realistic range**
Fleet acquisition CAPEX	€23.5 M	€20–29 M
Annual fleet and service OPEX	€9.43 M/year	€7.9–11.2 M/year
Useful economic life	25–30 years	
Major battery replacement	Around years 8–10	Depending on charging cycles

Executive estimate. All figures are in 2026 prices, excluding recoverable VAT.

A favourable setting, as the project has been ideated, could be:

Parameter	Working assumption
Passenger capacity	60 passengers
Length	15–17 m
Beam	Approximately 5.5–6 m
Propulsion	2 × 50–60 kW
Battery capacity	Approximately 250–350 kWh
Solar panels	3.5–6 kWp
Service speed	Approximately 7 knots
Maximum speed	8–9 knots
Charging	Overnight charging plus terminal top-ups
Crew	1 qualified skipper + 1 passenger/deck officer
Accessibility	Step-free boarding and wheelchair spaces
Passenger environment	Enclosed, heated and air-conditioned cabin

Component	Estimated cost per vessel
Original Magenta-type vessel benchmark	€1.00 M
Enclosed superstructure, glazing, insulation and HVAC	€0.12 M
Larger propulsion system, battery and charging equipment	€0.18 M
Public-transport interior, wheelchair spaces and boarding equipment	€0.07 M
Navigation, CCTV, passenger information, communications and ticketing	€0.05 M
Certification and design allocation	€0.05 M
Series-production discount for 14 units	–€0.07 M
Estimated contract price per vessel	€1.40 M

Estimated price per customised vessel

The €1.40 million unit price is the theoretical price we considered, not the real one, since this would be a tailor-made project.

Item	Cost
14 vessels × €1.40 M	€19.60 M
Prototype engineering and first-of-class testing	€0.55 M
Delivery to Rome and commissioning	€0.42 M
Initial spare parts, diagnostic equipment and crew training	€0.48 M
Owner’s engineer, acceptance tests and classification support	€0.30 M
Procurement contingency – approximately 10%	€2.14 M
Total fleet CAPEX	€23.49 M

Total fleet CAPEX

Financial model and consolidated economic analysis - a Public-Private Partnership

PPP Structure

TiberConnect would be developed through a long-term Design - Build - Finance - Operate - Mantain (DBFOM) Public-Private Partnership that will combine public control with private financing and operation management. Roma Capitale would have the role of the public contracting authority. It would launch the competitive tender that grants access to the use of public land and riverbanks, and it would ensure the integration of the service in the pre-existing transport network. The municipality would be responsible for providing a yearly fixed financial compensation to the operator, if necessary, to cover the gap between affordable ticket price and cost of operation.

TiberConnect would implement and operate the project, secure financing, develop the stations, procure electric vessels and operate them. The operator would collect ticket and advertising revenues, manage the infrastructure and monitor the overall performance according to the contractual KPIs. It would bear construction, lifecycle and service availability risks. This structure would allow Roma Capitale to retain control over the affordability and accessibility of the service, while leaving the private partner responsible for infrastructure development and day-to-day operations.

The PPP model presents some financial and operational risks, mainly related to the tender, when the private partner incurs preliminary costs without any guarantee of obtaining the concession. However, this uncertainty is addressed through an arrangement whereby the public authority covers part of the project costs if the contract is not awarded.

Consolidated economic analysis

The revised financial model combines the project's investment requirements, operating costs and revenue scenarios to assess the financial sustainability of TiberConnect during the first year of operations, with a 20-year concession period considered. The project requires an estimated €44.09 million CAPEX, assumed to be fully privately financed, while annual OPEX amounts to €9.43 million.

Commercial revenues, including fares and ancillary income, vary significantly according to demand, reaching approximately €5.60 million in the Conservative scenario, €8.00 million in the Base scenario and €10.52 million in the Optimistic scenario.

Before any public support, this produces operating results of - €3.83 million, - €1.43 million and + €1.09 million, respectively, considering that the operating break-even point is reached at an estimated 74% load factor.

Assuming a potential annual municipal fare compensation of €2.18 million, aimed at limiting the burden of ticket prices on passengers, the resulting year 1 profit/loss becomes approximately - €1.65 million in the Conservative case, + €0.75 million in the Base case and + €3.27 million in the Optimistic case. The analysis therefore shows that operating sustainability is highly dependent on actual demand levels, while the recovery of the initial private investment would require additional mechanisms, such as public or EU grants, a reduction in the privately financed share of CAPEX, higher-value tourist or premium fares, additional commercial rights, or a combination of these measures.

	CONSERVATIVE	BASE	OPTIMISTIC
Annual ticket revenue	5,047,298	7,450,773	9,974,422
Estimated additional revenue stream from advertisments, sponsorships and chartering	550,000	550,000	550,000
Total commercial revenue	**5,597,298**	**8,000,773**	**10,524,422**
(OPEX)	9,430,000	9,430,000	9,430,000
Operating funding gap/(surplus)	**3,832,702**	**1,429,227**	**(1,094,422)**

Component – Year 1 in million euros		CONSERVATIVE	BASE	OPTIMISTIC
OPEX		(9.43)	(9.43)	(9.43)
TiberConnect operating margin	8% × €9.43 M€	0.75	0.75	0.75
Commercial revenue retained	Fares + ancillary revenues	5.60	8.00	10.52
Operating results before compensation	Commercial revenue - OPEX	(3.83)	(1.43)	1.09
Potential municipal fare compensation	Considering base case fare compensation	**2.18**	**2.18**	**2.18**
Profit/Loss		**(1.65)**	**0.75**	**3.27**

Timeline of the project

The implementation of Tiberconnect is expected to take from 66 to 72 months and is divided into five phases.
The first phase (months 0-10) involves the creation of the team project and the engagement with stakeholders. This will allow to work on assessing demand, navigability and potential risks. At the same time the ten months will be used to define station layouts, operating model and financial plan. The second phase (months 11-30) involves obtaining all necessary concessions and heritage approvals from Roma Capitale along with the definition of funding arrangements and the preparation of the tender documents. During the third phase (months 31-45), the PPP would be finalized and financing would be secured, reaching financial close. The fourth phase (months 46-64) involves the construction of the stations, the manufacturing and delivery of the vessels and the installation of the charging infrastructure. Finally, the last phase (months 62-72) will be characterized by technical and operational testing, safety certification, employee training and the integration of the service into the ATAC Roma app.

Conclusion - Why invest in TiberConnect?

TiberConnect is an opportunity to address Rome's increasing mobility challenges by transforming an underutilized asset, such as the Tiber, to create an alternative public transport corridor that eliminates pressure from the existing road network.

Having a diversified revenue model, with the PPP model that combines public payments, ticket fares, performance-based adjustments and multiple commercial opportunities, TiberConnect reduces reliance on a single revenue source, with additional upside potential.

Additionally, TiberConnect's modular stations and electric vessels allow phased implementation with limited irreversible construction. Finally, the project translates the objectives of Rome's Programma Strategico e Operativo del Tevere of making the river Tiber a key element of the city's sustainable mobility and urban regeneration into a concrete mobility service.

By combining public objectives with private-sector operational expertise, TiberConnect aims to deliver long-term economic, environmental and social value for the city of Rome.