



Short Sea Shipping: Evidence from Campania, Southern Italy

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Abstract

Background: The urban transport systems of coastal cities are conditioned by the limitations placed by their coastal position on the expansion of radial networks. However, while the water around them compresses terrestrial routes, it simultaneously creates space for alternative transport systems to support urban and metropolitan mobility.

Objective: This study aims to evaluate the feasibility of establishing new navigation lines to support certain coastal locations in the gulfs of Naples and Salerno in Campania (Italy) which, due to their nature, are particularly suitable for the movement of the huge tourist flows that affect the area under analysis.

Methods: This study expands upon specific previous and ongoing experiences, clarifying their strengths and weaknesses, identifying the basic characteristics of hypothesized fast maritime lines, and drawing conclusions about their technical and economic feasibility.

Results: Based on the level of detail available to the present study, the hypothesized service does not seem to offer complete economic-financial sustainability. The primary shortcoming lies in the resources needed to adapt technical structures and to support businesses during the initial phase of the project.

Conclusions: The feasibility of new transport services depends on the extent to which existing traffic can be subtracted the modes of transport already in operation. In the absence of public subsidies, the speed, frequency, regularity and safety of such transport are crucial.

Keywords: Short Sea Shipping; Tourism; Campania Region.

1. Introduction

A network of transport connections by sea is particularly important for metropolitan areas with a coastal outlook over the sea. Normally, these medium-distance connections are effectively solved with the lines defined as Motorways of the Sea by the Article 21 of the European Union (EU) Regulation 1315/2013 on the Trans-European Transport Network (TEN-T; European Parliament, 2013). They shall consist of short-sea routes, ports, associated maritime infrastructure and equipment, and facilities as well as simplified administrative formalities enabling short-sea shipping or sea-river services to

operate between at least two ports, including hinterland connections. This kind of transport allow reducing road congestion through modal shift. This coastal link, brought down to the scale of local links in a single region, allows the pleasure of boating in a significant landscape area to be enjoyed in the same way as road traffic is shifted to the sea. This is often characterized by an expansion parallel to the coast, offering an increased possibility of integrating almost all the centres into a system of navigation lines. However, a commitment of private capital is almost always required to overcome limited public resources and generate the benefits of such extended networks (European Commission 2015). This need is particularly relevant in situations such as the one under consideration, which have substantial market potential thanks to a recent expansion in local tourism (UNWTO 2015).

The relationship between transport and tourism is complementary (Espiner et. al. 2017), and can provide desirable outcomes for companies that offer services enhancing tourist mobility. Beyond that, infrastructure and related projects are basic elements for the increase in bilateral trade and the advancement of operational performance of economic and financial variables is crucial in order to reap maximum gains from trade (Carlucci et al., 2018).

For regions endowed with inherent attraction to tourists (Algieri and Alvarez 2022), such as Campania in Italy, the improvement and expansion of tourist mobility serves not only to improve the economic potential of these services, but the synergistic effect (and induced demand) these improvements have on increasing tourism to the area.

It is appropriate to mention here something that will be discussed later: namely, that the profitability of services hypothesized by this study is dependent upon the existence of organization responsible for guaranteeing quality standards across these services (Extraordinary Plan for Tourist Mobility 2017-2022). These standards must be applied not only to intrinsic characteristics of the transport services (e.g. safety, comfort, cleanliness, regularity, frequency), but also to each service's integration with the wider network and the broader tourist offering (Gorjan et. al., 2022).

To attract new demand, a series of integrations are necessary, both 'horizontal' (integrating with other transport services) and 'vertical' (integrating with other tourist services) (Fong et. al., 2021). These integrations are crucial to ensure that tourists moving through the area do not feel a sense of 'displacement' when moving from one to another, but instead perceive each element to be a segment of a unified whole, offering comfort, safety, and opportunities to enjoy adjacent amenities or landscapes as they wish. In most cases, there is still a lack of an organic and comprehensive vision through which these integrations—and commensurate growths in tourism demand and complementary transport services—can be achieved (Kim, Choi, Yan, & Dooley, 2011).

In this context, public policymakers can play a central and strategic role (Hjalager 2020), facilitating constructive dialogue between the different operators in order to overcome discontinuity and dispersion both in planning and in execution. If collaborative development is the goal, it is worth reiterating the principles governing sustainable tourism and the 'blue economy', whose paradigms are defined by the Tourism Sustainability Group (2007) as follows:

- Reduction of demand seasonality
- Reduction the impact of transport in the tourism sector
- Improvement of the quality of employment in the tourism sector
- Improvement of the host community

- Reduction of resource use and waste generation
- Conservation and enhancement of cultural and natural heritage
- Organization of holidays accessible to all
- Promotion of tourism as a tool for sustainable development

The study was carried out in 2018, so they do not take into account the effects of the Covid-19 pandemic. However, the methodology and results remain valid. In their *Report On The Economy Of The Sea VI* (2017), the Chamber of Commerce of Latina records the added value of the blue economy sector at €43bn in 2016, which equates to 3% of the total economy over the same period. Within the sector:

- 10% of companies are led by people under 35 years of age
- Its 800,000 workers represent 3.5% of total national employment (having increased three percentage points from 2011 to 2016)
- Maritime transport comprises 11,000 companies, equal to 5.9% of total entrepreneurial activity within the sector
- Added value from the sector increased by 17.8% between 2011 and 2016.

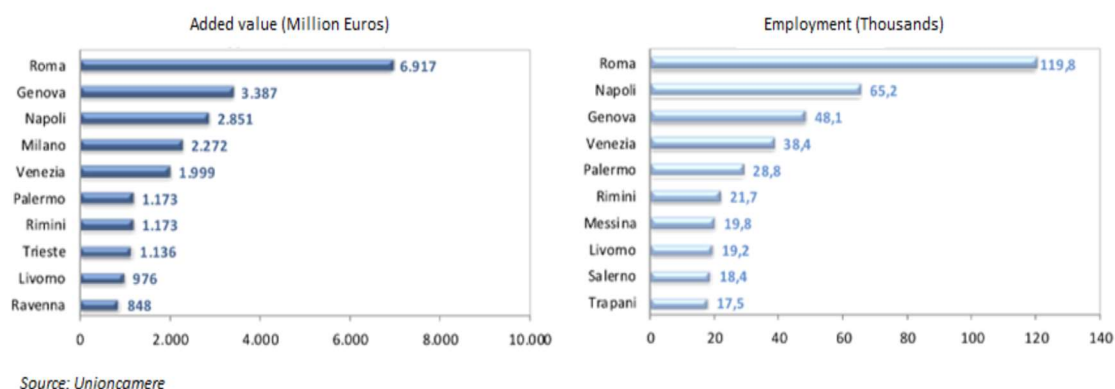


Fig. 1 - Added value and employment of the economy of the sea by sector – 2016

The blue economy produces substantial added value (€3.4bn in Genoa, €2.8bn in Naples, €2.3bn in Milan), and sustains significant employment opportunities (approximately 65,000 workers in Naples, for example). These are significant figures, indicative of an important and developing industry.

The hypothesis of services in this study inevitably raises questions of environmental sustainability. The construction of maritime lines to support passenger flows in the gulfs of Naples and Salerno—as an alternative to land transport—guarantees a systemic advantage by lightening the load and reducing the congestion of road routes.

Moreover, transport is a fundamental prerequisite for, and plays a key role in, the quality of any tourism offering. Even the act of travelling to a tourist destination can become a tourist attraction in and of itself, if the traveller is able to visit locations and amenities on route and experience the country in an authentic way.

Younger generations of tourists, such as ‘millennials’, are particularly attuned to the eco-friendliness and authenticity of their travel. The first generation raised entirely in a

digital age, they tend to favour freedom of movement, authentic destinations, direct contact with local communities, and a weaving together of digital and physical interactions (Extraordinary Plan for Tourist Mobility 2017-2022).

This paper hypothesizes a passenger line by sea capable of integration with existing transport networks, helping to make it more sustainable primarily in environmental terms, but also in an economic sense as well. There is no doubt that the most competitive modal alternative—road transport networks—has a greater level of negative environmental impact than its maritime counterpart. In addition, the difference in terms of generalized cost should not be underestimated. Road transport is characterized by considerable levels of congestion and risk (in the sense of safety), especially among private motorists, who make up the bulk of this type of traffic.

The goal of the paper is to verify whether the activation of new maritime lines would be useful to the Campania region in terms of reducing road traffic and providing a more sustainable and pleasant alternative to tourists and residents hoping to visit the region during the summer.

Specific previous and ongoing experiences are explored, and their strengths and weaknesses are identified. The basic characteristics of the hypothesized fast maritime lines are also sketched out, along with their technical and economic feasibility and some provisional conclusions.

2. Methodology and basic assumptions

In order to make the proposed service sustainable, both from an economic and an environmental point of view—as well as aligning it with the provisions of current legislation in Italy and in the European Union (EU)—the proposal hinges on a service organization characterized by a high commercial speed. This is rendered achievable by compressing the number of stops, and maintaining a high frequency, in line with the needs of a demand for urban mobility.

The activation of these hypothesized lines could certainly contribute to the decongestion of road traffic, while offering an alternative service to the many tourists and residents of Campania, making the coastal and cultural areas of the region more accessible. At the same time, it would limit the environmental aggression that characterizes most transport activities.

The feasibility analysis focuses on the conditions necessary for the activation of the service in a defined time or season. The use of a maritime line to access the resorts of the coast represents not only the safest mode, but also the most comfortable, especially during the summer season. For mobility to and from tourist and seaside destinations in particular, a maritime route would allow tourists to avoid the stress of road congestion, would reduce CO₂ emissions and to live and enjoy the wonderful coastal landscape of the Campania region.

The proposed operating period would be seasonal, from June to September, to reflect the higher potential influx of passengers and the more favorable weather and sea conditions.

At the service of the itineraries that will be indicated below, there are several modal alternatives. In addition to the presence of a capillary road network providing a conduit for private transport to various points of the region, there are also a good number of local public transport services (road and rail), even if they are poorly integrated. It should also be noted here that the distances between the locations identified in the different land-

based itineraries are relatively contained, with the greatest being approximately 27 kilometres on the route between Marina di Stabia and Sorrento.

Despite being equipped with a substantial and well-branched land transport network, the region frequently experiences widespread congestion, especially in the summer, which limits accessibility for tourists. The primary issues of road accessibility are:

- A high volume of car traffic generating widespread congestion which, in turn, causes travel times to grow exponentially, particular in the summer months
- The poor quality of the road connection between the metropolitan area of Naples and the Sorrento peninsula
- Accessibility by road to the Naples, which is compromised by high levels of congestion in the main network that facilitates access to the city center of Naples

In addition to these systemic weaknesses, the transport networks under investigation also operate sub-optimally due to their low level of integration with other modes of transport. Such an 'open mesh' transport network reduces the efficiency of mobility, resulting in more frequent and consistent congestion and modal imbalance. In turn, these cause a generalized increase in the cost of travel.

Specifically, there are issues stemming from the low level of integration between road and rail transport, mainly due to the inadequacy of public road services for secondary railway stations and rest areas for private cars at railway and port terminals.

Looking at the qualitative-quantitative level of services offered, considerable inhomogeneities are evident. Areas with sufficient levels of accessibility do coexist, but little effort has been made to address traffic flow, and low standards of infrastructure result in poor management of control systems.

To summarize, here are the key factors negatively affecting the environmental impact and accessibility of existing transport activities:

- Failure to modernise road and rail transport networks, resulting in operations that run below minimum efficiency standards
- Insufficient maintenance of transport infrastructures
- A lack of integrated traffic hubs, both from territorial and tourist perspectives
- Inadequate rail and road connections between local areas and major longitudinal and transverse routes
- Few multimodal connections and exchange nodes between the different modes of transport

In order to address and meet the needs of the various participants in these networks, it was necessary to:

- Collect data and information from operators who have a service that has characteristics similar to the services hypothesized in this study;
- Conduct interviews;
- Organize inspections
- Collect and analyze statistical data
- Identify the strengths and weaknesses of previous experiences from which to draw conclusions and indications.

Account was also taken of the existing maritime services on offer, and of land connection services (road and rail), along with the benefits derived from a shared approach that takes into account the benefits of all the categories examined (user, operator, local government and community). More plainly, it is only possible to identify a positive usefulness of the introduction of such lines (under conditions to be determined) from the perspective of the common benefit.

In terms of methodology, a qualitative and quantitative evaluation was carried out, after having defined the distribution of the origin/destination moorings, starting from the hypothesis of lines serving the most attractive places from a tourist point of view, characterized by a relatively small number of stops, through inspections, for each individual stopover identified:

- Land accessibility (road and rail)
- Maritime accessibility in terms of infrastructural equipment of berths
- Occupation of the quay based on the requests for approach authorized by the Campania region
- Provision of reception services such as bars, connecting bus services to the internal areas to reach primary tourist attractions or railway stations and centers, as well as toilets, parking lots, points of sale and benches in shaded areas

To make the field survey exhaustive, verification and evaluation was undertaken of the alternative land connection services present in the territory, offered by private operators, which represent (or could represent) a valid alternative to the maritime lines currently in operation, or compete with the services covered by this study.

The technical feasibility of the project had to be weighed—for example, the technical characteristics of the ship and the costs of activation and management—to establish whether the lines proposed by the study would actually represent an economic convenience for companies and for the end user. Inevitably, this required analysis of the likely demand by passengers potentially interested in the use of the service.

To formulate the cost of the service as accurately as possible, the following figures (derived from a survey conducted among the operators in the sector) were used:

- Cost of staff = €800-900 per day
- Fuel consumption = ~ 800 litres per hour
- Cost of fuel, including VAT = €0.61 per litre
- Hourly cost of fuel, therefore = ~ €488
- Cost of shipping = ~ €1,000,000 euros
- Depreciation = approximately 10 years
- Indirect costs = 0.1% of direct costs

Starting from these costs and averaging the prices applied each way, we arrive at an assumed unit cost per passenger of the service of €10 per hour. This figure is based on the absence of any public funding, and vessel cruising speeds of 30 knots.

In this first phase, without the ability to reliably estimate the demand generated by the new service and/or attracted by other modes of transport, we hypothesized a tariff structure suitable for covering direct and indirect costs, as well as a minimum profit

margin for the year. Based on the comparison and the established price, the minimum passenger demand required to cover the cost of the service was derived.

With this methodology it is possible to evaluate different scenarios, the first of which provides for the establishment of an incentive for the start-up phase for a period not exceeding 3 years, subsidized by the Campania region.

To assist with creating a culture of transport by sea, we chose to start from connections that would not require adaptation or interventions in the relevant ports or a dedicated supply chain service to the points of greatest tourist attraction.

3. Discussion

The hypothesized service would be configured as a high-frequency service, operating in a defined seasonal period (June-September), with a regular schedule, and a reduced number of stops, with less frequent and fast services between the months of June and September. During the months of July and August, more frequent and faster runs would be planned. From a survey of the main arteries of tourist traffic in Campania, it became clear that the following routes would be most suitable:

- Line 1: Baia – Pozzuoli – Napoli Mergellina – Napoli Molo Beverello
- Line 2: Molo Beverello – Torre del Greco – Marina di Stabia – Sorrento (Marina Grande)
- Line 3: Sorrento – Positano – Amalfi – Salerno
- Line 4: Salerno – Agropoli – Acciaroli – Palinuro



Based on the level of detail available to the present study, the hypothesized service does not seem to have the characteristics necessary for complete economic-financial sustainability. The main shortcoming concerns the resources needed both to adapt technical structures and to support businesses during the start-up phase. Public contributions and management would be required for at least the first three years of the service. After this point, assessments can be made to determine whether or not the

consolidation of the lines would offer sufficient stability for the passenger community and permit economic self-sustenance.

At a minimum, fast sea line services must commit to the following improvements:

- Reception on the ground side for moorings—docks, toilets, bars, accommodation facilities such as info points, newsagents—in the nodes of Baia, Pozzuoli, Marina di Stabia
- Provision of electronic and integrated ticketing services that cover visitors from the beginning to the end of dedicated historical tourist and bathing routes, and properly studied and organized itineraries
- Discounted rates for students, seniors and other categories of customer
- Massive campaigns to promote the services using, amongst other platforms, dedicated apps
- Training of qualified personnel ready to welcome local and foreign users
- Packages affiliated with sites of historical, archaeological and seaside interest
- Integration of sea/land transport to achieve the destinations of greatest cultural and landscape interest in the region.

The analyses undertaken show that the Vesuvius and Phlegraean elements are critical in terms of accessibility through local public transport, and currently suffer from a paucity of accommodation facilities. By contrast, the Cilento area appears much more organized and structured in terms of its provisions for tourists. Despite being home to a wealth of historically and artistically interesting sites (the thermal baths of Baia, the Castle of Baia, the Macellum of Pozzuoli, the Flavian amphitheater of Pozzuoli, the cave of the Sibilla Cumana, to name but a few), the Phlegraean area does not seem to arouse much interest among tour operators or those who deal with the organization of tourist visits.

In summary, the advantages of the hypothesized lines are:

- Worthwhile tourist links at affordable prices with a range of additional benefits
- Proximate routes and short journey times
- Making Naples easier to reach from Baia by public transport (about one hour of travel)
- A reduction in the already heavy road traffic during summer months
- Increased access to tourist and landscape destinations of great value

The disadvantages of the hypothesized lines are:

- No integration with the transport of the last mile to reach the places of interest of historical tourist and seaside value.
- Poor presence of support services to tourists (benches, parking, integrated and electronic tickets, bars, newsagents, info points, Wi-Fi, qualified personnel, adequate promotional campaigns).

4. Conclusion

Initially, the objective of this study was to evaluate the possible enhancement of maritime services on the relationships identified and simultaneously, on the basis of costs, make a first evaluation of "market" services (i.e. services capable of draining a demand

that would allow costs to be covered by a ticket price matching the willingness to pay with potential demand).

This is not the first study to highlight the need to focus on the integration of transport systems. The landscape and historical riches that characterize the relevant locations are driving forces for regional and national economic development. As such, it is prudent to maintain and enhance the appeal of the territory in terms of the quality of sites on offer, and to do so through a professional and qualified reception service. It is well understood that urban quality enhances the economy of ports, and the quality of ports in turn benefit cities and territories as a whole. Cultural activities make it possible to bring citizens and visitors closer to maritime travel, no longer experienced as purely functional transport, but instead as a value-added activity.

Finally, for each port node of the local maritime transport network, the speed and fluidity of docking, loading and unloading operations should be streamlined and increased. In addition, connections with regional transport networks on the land side should be made faster. Ideally, passengers or tourists would be able to purchase a single ticket that covers their entire trip, from the point of departure to the point of arrival (whether sea or land-based) including visits to museums, archaeological sites, bathing establishments, and other attractions.

Currently, much remains to be done in the cities under consideration to bring them up to speed with a digital world and 'digital' travellers. It seems reasonable to expect that services should be able to provide swift journeys without commanding high prices for those journeys. Based on the calculations above, the cruising speed of ships on the route would be 23 knots.

The four hypothesized lines all have potential for great success, especially if the lines are enhanced by cross-modal integrations. They would also benefit from facilitations for protected bands, agreements and offers integrated with bathing beaches and promotions with hotels and restaurants, as well as a strengthening of digital infrastructures.

From a managerial point of view, the present study also provides concrete recommendations on the development of the management control of such a company, with particular respect to the possible optimizations of costs and implementation times of certain maritime lines. For policymakers, moreover, the study provides an important tool to interpret the existing dynamics establish a programme of optimization for investment resources.

On the basis of the investigations carried out, this study evaluates the feasibility of establishing new navigation lines to support certain coastal locations in the gulfs of Naples and Salerno in Campania which, due to their nature, are particularly suitable for the movement of the huge tourist flows that affect the area under analysis.

Inevitably, the economic feasibility of such services depends substantially on the ability to attract and divert traffic from other modes of transport. In the case of local transport services, these hypothesized services would be operating in a market where demand is already consolidated in quantitative terms; the short-term operating profitability depends on subtracting traffic shares from other transport lines. Only in the long term could the offerings of the hypothesized services lead to an increase in overall demand.

It is reasonable to assume, therefore, that from an entrepreneurial point of view the feasibility of the new transport services depends mainly on conditions that can be verified immediately: namely, the possibility of subtracting traffic from the modes of transport already in operation. That capacity, in turn, depends on the speed, frequency, regularity and safety of the transport, factors that ultimately affect the cost of the services and which,

in the absence of public subsidies, dictate the price of the service. Nonetheless, the study also highlights two characteristics of the service that are particularly significant in terms of attractiveness of demand, but which have only a marginal impact on the costs of producing the service. First is the ‘horizontal’ integration, which synchronizes the hypothesized segment with the other links in the transport chain. Second is the ‘vertical’ integration, through which mutually beneficial effects can be generated by connecting transport services in the strictest sense with other upstream and downstream services.

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