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CULTURE, NATURE & COAST: THREE DETERMINANTS EMPLOYED FOR THE RE-APPROPRIATION OF THE REDUNDANT RAILWAY NETWORK OF PELOPONNESE.

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Abstract

The paper explores alternative strategies that will allow the currently inactive railway line of the Peloponnese to create renewed value for tourism and agriculture. By exploring synergies across different scales it discusses alternative determinants that can become operational for the re-appropriation of obsolete railway branches. The methodology resides on the comprehensive reading of rail infrastructure as driver of the wider socio-spatial process. By establishing a broader understanding of the regional characteristics that underpin efficiency and innovation within combined economic activities of the region, the research unveils significant benefits for the creation of multiple sources of direct and indirect investment reflecting the maximization and adaptation of existing structures within inert market potentials. The *"train-by boat"*, the *"green-supply chains"*, the *"knowledge corridor"* and the *"cruise train"* are discussed as resilient determinants within a changing transport landscape which aims for adaptability to the current fluctuating social and economic structures.

Keywords

Rail networks, Cruise Trains, Service Ecologies, Agro-Food Supply Chains, Knowledge Economy

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Introduction

In a conjuncture of limited resources, redevelopment of the Greek railway remains one of the largest infrastructural projects underway. Despite the macro-economic benefits foreseen by policy-makers over efficient and faster transport infrastructures in core networks, peripheral branches with low mobility interest have met the demise of re-appropriation policies. Significantly, major innovation policies towards the rail industry are largely affected by new infrastructure (e.g. high speed lines), privatization and changes in intermodal freight transport (Wiesenthal et al., 2010). This observed gravitation towards selective technological modernization has prioritized tunneling effects within well-connected mega-cities while it has intensified the abandonment of regional rail branches within de-populated and fragmented rural zones.

Such is the case of NW Peloponnese, where centrally managed planning interventions were left empty of resilient solutions, bringing railway operations at a halt. Railway planning on the North-West axial corridor connecting Athens to Patras (under the larger vision of a coherent Ten-T Corridor 22) has performed for many years under a technocratic governmental agenda that has been exclusively oriented towards the technological modernization of the network. This top-down approach left untouched the wider socio-spatial interests, widening inequalities and fragmenting urban space. Further, it brought alterations and simplifications of the original development scenarios resulting into various bottlenecks. With the aim to challenge this phenomenon, and in the frame of recent bottom up planning discussions to which the authors have been involved and that have been initiated by the ETH spatial planning department (CODE PATRAS, 2015; CODE PELOPONESE, 2016, Scholl, et.al., 2016) this paper further discusses alternative determinants grounded in the specific regional characteristics of the study area that can become operational for the re-appropriation of obsolete railway branches.

1 Greek Railway Planning in question

Although contemporary research recognizes the need for integrated planning linking infrastructures to innovation processes of production structures (Cascetta, Pagliara, 2009; Scholl; 2012), the embeddedness of the networked railway paradigm in investment sectors of peripheral economies remains poorly studied in Greek regional planning (Giannakou, Natsinas 2009; Peric, Scholl 2016). Even though the "social capital" of the railway is an indicative issue in the Regional

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Spatial Planning Frameworks across Greece, there has been very little attention over the study of interactions with the local-regional economy and their quantitative- and qualitative- dimensions (Skouras et.al. 2010:2) beside the socio-ecological impacts affecting the major decentralized industries of tourism and agriculture.

Transport infrastructure and modernization towards a sustainable perspective has received a detailed approach through The White Paper on Transport (EC, 2011) and further programmatic actions in regional level research via the TEN-T Funding Program aiming towards the technological advancements of the means of mobility in distinctive transport categories. In this frame, rail innovation towards smart-green- low maintenance, climate resilient utilities, smooth logistics services and alternative fuels has become a strong objective in major projects of technological modernization of "obsolete" railway corridors. However, most of its directives do not relate to other economic paths and activities of the region it is embedded. Even though the current scientific focus presents novel aspects towards resilient management systems and services which overlap with local stakeholders and SMEs, it remains narrow in the mapping of potential synergies that may configure novel networks between various actors of relations in space.

Although these approaches offer significant indicators for innovation and sustainable development within the transport sector (clean fuels, low emissions etc.), they are weak in explaining how peripheral areas in request of spatial re-appropriation of redundant built-in infrastructures may benefit from synergetic aspects and across different economic sectors stimulating the need to describe new networked formations across space.

Within this frame presented by the technological innovation challenges of the European railway transport the condition of the agriculture-tourism nexus and the potential competitive advantage that can emerge over the re-appropriation of redundant rail infrastructures, acquires particular characteristics and challenges. Important potentials, have escaped most research efforts on the topic, calling for area-based, multifaceted empirical documentation.

1.1 Bottlenecks in the Peloponnese and around Patras region

The railway line in Peloponnese runs through the prefectures of Korinthia, Argolis, Arcadia, Messenia and Iliia, administratively belonging to two regions: Peloponnese and Western Greece (Theofanopoulos, 2015). In 2010, a large number of the normal train services were suspended in

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Peloponnese due to a reduced passenger demand, mainly after the construction of a new highway and the line's consequent lack of financial viability (Theofanopoulos, Frezadou, 2016). More precisely, the part of the metric gauge network that was particularly affected extends from Corinth to Olympia and has a total length of 490.5 km. Argos, Nafplion, Tripoli, Kiparrisia and Patras include some of the major cities that were affected by halted services. Simultaneously, North West Peloponnese and its major port city, Patras, constitute the southern peripheral branch of the Orient-East Mediterranean TEN-T Corridor 22 which has been engaged by financial instruments of the EU to boost competitiveness and develop "lean" freight transportations. This growth strategy foreseen by TEN-T policymakers in a macro-economics' perspective has informed much of the Hellenic Railways Organization's blueprint but has also met the clash of priorities by municipality officials and local stakeholders who have grown distrustful and skeptical about these recourses of these technological advancements, denoted also of over-dimensioned projects. The current inertia and slow growth of this re-modernization process, together with the expansion of inactive or obsolete branches throughout Peloponnese, quickly manifested the physical asymmetries and different planning cultures along this corridor (Peric, Scholl, 2016) leading to wider socio political bottlenecks in the developmental aspects of this project which further lead us to question its objectives for an integrated spatial development perspective. A "Gordian knot" in this stance has been the debate about developing a direct railhead connection with Patras new port further raising issues for a surface or underground operation across the city's urban fabric. Paradoxically, the official stance of the municipality of Patras has requested even more robust infrastructural programs to take place in order to "bury" the train away from the city's urban realm (Karayiannis, 2015) leading to over-dimensioned projects. This bottleneck, not only proves an infrastructural deficiency, but also relates to limited or stagnant economic resources, social oppositions, accessibility frictions, unmanaged run-off from the rich hydrological milieu of the area, raising social opposition (Drewello, 2012) and skepticism. This inability to bargain for an integrated planning solution through the crossing of the city of Patras further deprives west regions of the Peloponnese from accessing rail services for passengers and trade towards Athens and Piraeus.

2 Methodology for an Alternative Planning Approach

By challenging the current innovation policies that are largely dedicated to the inert characteristics of lean and specialized transport networks, this research discusses how a structured

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re-networking of cultural and natural assets alongside the redundant infrastructural assets currently disassociated from planning policies may become the backbone for a sustainable development of "a slow travel" (Lane, 2016) by bringing experimentation in existing and new areas of activities that impact local economies in peripheral regions such as tourism and the agro-food sector.

In this frame, it sees an unexplored opportunity in the novel linkage between redundant railway assets, localized capabilities and specialized resources. It suggests that a comprehensive exploration of competitive advantages is not to be found only within technological modernization of old rail infrastructures, but also demands a novel understanding of rail infrastructure. Significantly, one that shifts rail from an "axial" artifact to a socio-technical hybrid informed by the comparative advantages, the levels of heterogeneity and the carrying capacity of the region that supports it.

2.1 Setting the grounds for an alternative discourse

Currently, all technical railway planning solutions mobilized from decision makers "outside" the urban process carry with them an "abstraction" that is not easily embedded into the actual social and political dimensions of space (Ibanez, Katsikis 2014). A way to supersede those inertias and oppositions deriving from the clash of interests between top down policy makers and local stakeholders' initiatives relies on a broader understanding of bottom up processes, social dynamics and regional characteristics that underpin the persistence of efficiency and innovation (Scott, Storper 2003). The importance of an integrated planning approach between infrastructures and urbanization processes (Cascetta, Pagliara, 2009; Priemus, 2008) stressing the need to align spatial with infrastructural priorities (Scholl 2012) has followed a refined reading of the role and the importance of transportation infrastructures as mediators of flows, movement and exchange (Graham, Marvin, 2001:30) and as techno-natural hybrids that cannot be studied or evaluated as abstractions separate from their urban condition (Graham, Marvin 2001).

A central point towards this perspective relies on describing how synergies between the fixed assets (stations, redundant rail networks, warehouses and depots), the production systems as well as the natural assets all in proximity may generate innovation and development by initiating experimentation in existing and new areas of activities that impact tourism and agro-food business models in peripheral regions. In this frame this logic transforms the main question from "how rail

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infrastructure sustains agricultural, knowledge and tourism networks" to "how novel agro-food, knowledge and tourism networks emerge through the re-appropriation of rail infrastructure". This query leads us to the unpacking of a territorially informed agenda by inverting the idea of a unified terrain, acknowledging that each railway infrastructure is unique to its geographical location. This stance suggests that further exploration of alternative strategies, tied to the competitive advantages, must be traced in the levels of heterogeneity within regions. What characterizes mostly this perspective is:

- a) a restraint to the degree of substitutability of current infrastructures with technologically modern ones, since this is not the only "root" to the unlocking of wider developmental aspects
- b) the study of the region's carrying capacity in a socio-ecological perspective, modifying all necessary parameters that can contribute to added value, territorial cohesion and efficiency between networks and users

2.2 Service Ecologies

The above context requires rail planning development to be incorporated to a wider synthetic landscape with impacts across all economic sectors, with emphasis on surface mobility, knowledge economy, interconnectivity, tourism diversification and integration and adaptability to the natural characteristics of the region. By indexing together spatial patterns, environmental changes, processes and interactions formulates a fixity which is more of a "cause" than a result in "space". This fixity is highly dependent upon its networked pattern conception as well as to the multilayered potentials mobilized to expand our understanding and scale of observation for an integrated approach of spatial and railway development. This approach credits validity to the reading and understanding of processes into the wider landscape but always within a networked understanding. In this perspective, interregional connectivity, neighboring conditions and proximities across local knowledge production and the strong presence of the agro-food and tourism sectors are instrumental in developing a relational understanding of rails developmental aspects. Within this perspective, the intra-regional dependencies and interactions between different actors and land use regimes are set into a thorough meshwork of interactions describing benefits and competitive inputs from multimodal transport, transfer and exchange of information and know-how. This

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description aims to instigate interactions within different economic sectors as well as to render the flow of goods and services visible and the way in which they are grouped and classified as associated activities which affect directly or indirectly the rail network.

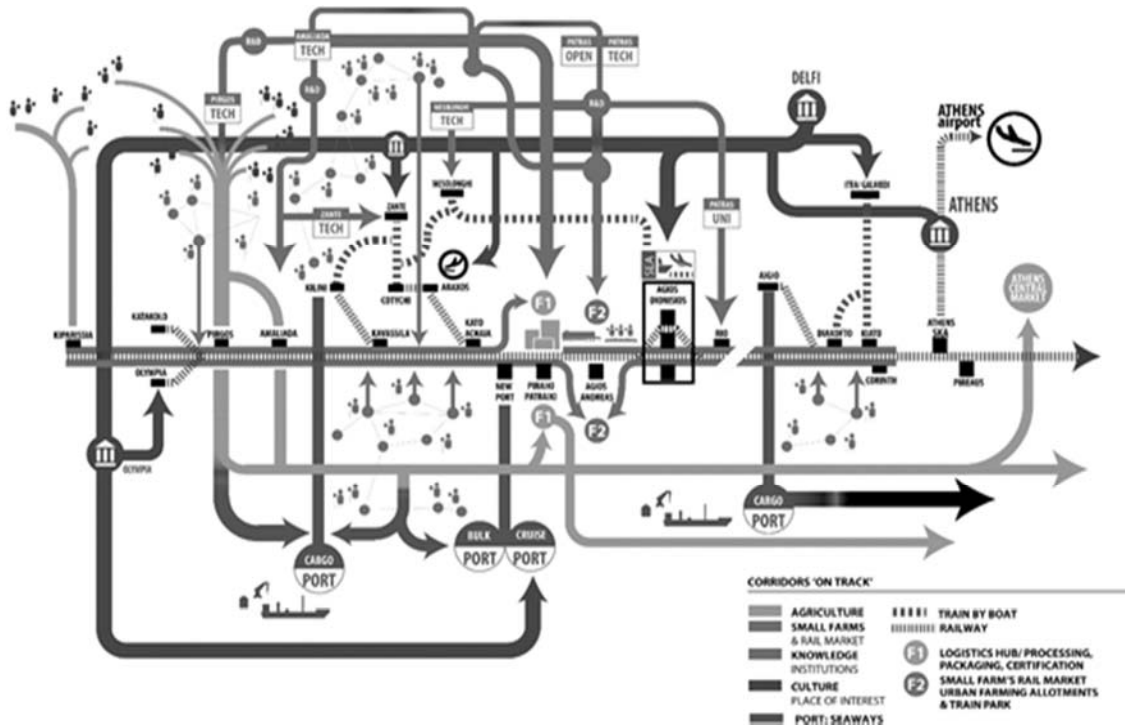


Figure 1: The webbing of synergies across diverse economic sectors alongside the Rail service of NW Peloponnese from Athens to Kyparissia

A significant attribute rising through this approach is the identification of heterogeneous threads of productive resources of the region of Peloponnese and the synergies that develop or are catalyzed between them via rail infrastructure. Description is not limited to how the technical railway infrastructure is stitched in its natural environment, but how a multilateral networking between existing natural attributes of the region, human resources and aspects of activities informs service ecologies. This term, corresponds to the activation and coordination of actions that serve a function through a multidimensional synthetic process (Forlizzi, 2013). Borrowed from social ecology and management disciplines (Morelli 2002), it combines reciprocal benefits for the development of the railway service within relationships and processes which develop political-economic and environmental conditions through organizational and operational practices. Service ecologies

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depend on the orchestration of different elements, in this case the physical geography and ground equipment, the cultural and social contexts surrounding railway infrastructure, the railway heritage as well as the economic "energetics" and regulatory frameworks that apply to it (Figure 1). This aspect releases rail infrastructure from a planning perspective that sees rail as an "artifact" in space, rebalancing its significance as a developed network and an intensive service. This concept further, suggests complex relationships and multi layered synergies that comprise a new scale of observation designing and describing how users, fields and immaterial services, previously excluded from traditional planning discourses, are shaped and performed.

3 Service ecologies in the observational perimeter

3.1 Feasibility towards a sustainable strategy

The purpose of the study is not to design the service ecologies themselves, but rather to plan for a landscape that will facilitate them and allow them to emerge in creative and even unpredictable ways. Catalytic element of this landscape is the rail infrastructure. This eventually bottom up strategy of selective and piecemeal equipment of the ground in order to create a meshwork of potential activities instead of a rigid network of predefined functions has four main aspects:

3.1.1 *Uncertainty / Risk*

Current financial situation in Greece creates a rather distorted set of macroeconomic and demographic data that does not allow for sturdy midterm or long-term planning and projections and moreover makes it quite difficult to justify any large-scale direct investment. This requires a strategy that would be able to deal with uncertainty, reduce risk by distributing it over a number of economic sectors and maximize the impact of any investment through synergies and spill-over effects. A second type of risk that the strategy tackles is environmental risk: following the increasing need for environmental management, the proposal does not consider natural systems as a layer to be resolved at the end of the project through engineering, but as a starting point, an inspiration for potential synergies.

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3.1.2 Maximisation / adaptation of existent structures and infrastructures

Moreover, this same context highlights the importance of smaller scale / piecemeal interventions in the geographic and socio-economic landscape that can work with a) upgrading, extending, adding to existing infrastructure that is now either being devalorized or underutilized and b) already existing and developed economic sectors that have not met their full potential.

3.1.3 Multiple sources of direct and indirect investment

As a result, the creation of this synergetic landscape would be easily adaptable to the existing conditions, both of land use and infrastructural equipment as well as of social and economic structures. At the same time it would be less dependent on large scale investment and as a result easier to implement and combine with existing funding schemes (coming from various sources of the public sector). A synergetic landscape might even attract additional investment from the private sector that would identify the opportunities that emerge from being plugged into the overall meshwork of positive externalities created. Again here, the importance of environmental management in the proposal, would allow the project to tap into larger investment pools regularly dedicated to large scale engineering works that the project renders redundant.

3.1.4 Activation of inert market potentials

The additional demand that will support these distributed and diverse investments is not expected to come from the development of a new market pool, but from the maximization of the potentials of existing market pools that are rather inert.

3.2 Specifications for Service Ecologies

Three categories of the built environment offer opportunities for reactivation / recombination:

a) Rail corridors and the abandoned / underutilized metric line; b) Port infrastructures; c) Unused or abandoned building shells. These three elements of the built environment are combined with four economic activities across the whole spectrum of economic sectors: a) Agriculture and especially fruits, vegetables and vine; b) Food processing and packaging; c) Research and knowledge economy;

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d) Tourism, archaeological sites in particular alongside the natural assets provided through the rich hydrologic regime and the potential for sustainable reuse of run-off drainage solutions.

It is suggested that the integration of the versatile elements into a thick mesh guarantees the feasibility of the proposal: even if several of the proposed interventions do not work out, (e.g. an economic activity or infrastructural adaptation fails to be activated) this does not mean that the rest of the landscape cannot be activated in different ways. Nevertheless, the specifics of the suggested framework of interventions are as follows:

3.2.1 Agriculture

The existing metric line of the Peloponnese network runs through major areas of agricultural production especially in its west and south part (annual agricultural production steady around 4,000,000T), while its eastern and northern circuit connects the port of Patras (freight in the range of 80,000T/year) with the ports of Aigio (12,000T/year) and Katakolo (15,000T/year). This suggests a potential for a rail / port / regional agricultural production synergy that would be based on the upgrading of the existing metric line, and its utilization as a green freight corridor. Instead of planning for maximum intermodality at the port of Patras (whose traffic numbers are not particularly promising, anyway), our proposal suggests a distributed intermodality that would take advantage of the facilities of all three ports and their proximity to the existing line and to major areas of primary production. With minimum investment on infrastructure this condition could be aligned with the restructuring of the agricultural industry along the same lines of smaller, 'regional' scale production. This restructuring of the agricultural economy could prove very competitive within the EU quality specification frameworks that largely promote specific geographical origins and regional production systems. The combination with a 'green' freight corridor could not only prove cost efficient, but also allow for a rebranding of the agricultural products in a very eco-friendly / organic way. Primary agricultural production could be combined with food processing / certification / packaging facilities in the vicinity of rail stations along the line and a central logistics hub in *Piraiiki-Patraiki* industrial shell in Patras. The development of robust processing / packaging sector is crucial to ensure that as much added value of the exports as possible remains in the region (Carydi, et.al., 2015).

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3.2.2 Stitching the Knowledge Corridor

Rail infrastructure sustains agricultural networks in a twofold way. Firstly by establishing a more sustainable mode of transport for the growing amount of goods, and secondly by re-addressing its role as a knowledge corridor by intensifying cross operations and activities in the already existing clusters of knowledge comprised by numerous existing higher education institutions. Agricultural production in the railway catchment area remains low-tech and small to medium-scaled without customized production activities (Keeler, Skuras, 1990) and without direct access to economies of scale and innovation (National Bank of Greece, 2015). In the same time, a clustering of higher technological institutions, with ancillary research fields to the primary economic sector are in close proximity from the rail catchment area (Figure 2). However, current research and linkages with the business sector are weak. All these educational institutions promise a rich intellectual and research base, which remains fragmented. According to current regional research, a combinatorial strategy between the above components is possible through a regional specialization process that targets on cluster programs for agro-food, tourism and manufacturing sectors and cross-sectoral support for technological upgrading by identifying key enabling technologies important to the regional business sectors. In this perspective, an expansive rail operation in NW Peloponnese forms the premises for a 'knowledge corridor' that could add increased mobility and complementarity between the institutions themselves and, in addition, host selected R&D hubs in bigger cities. The innovation centers could be specifically related to fields of the primary and secondary economic sectors, such as the growing agro-wine industry and the accompanying processing, packaging, distribution, marketing of products. The condition of reliable and fast connectivity not only enhances the complementarity between the institutions but also allows mobility between agro-production and research centers. These parameters together with ensured locational benefits enable the diffusion of knowledge and the promotion of innovation spillovers in additional economic activities (Feldman, Audretsch, 1999; Storper, 2000). The interaction and communication between those activities also cultivates high quality outputs and methods for good practiced agriculture, standardization, packaging and access to organizational practices for competitive supply chains.

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3.2.3 "Train by Boat"

The upgraded rail line in NW Peloponnese could also serve as a catalyst for connecting major archaeological sites along and across the coast up to Athens and the port of Piraeus. An intermodal system of rail and boat connections would create a unique network of flagship sites such as Olympia, Epidaurus, Mykenes and Delphi. As these areas are all located along a sea-route that runs parallel to the Athens-Patras railway line, commanding magnificent and strangely underestimated journeys, there is a strong potential in diversifying accessibility by mobilizing intermodal operations between rail and boat via the Gulfs of Patras and Corinth. Such interconnections have rarely been identified, since road infrastructure maintains the largest share as access mode. Initializing this 'train by boat' venture under its own terms of funding and management, the OSE Railway Company could profit greatly by establishing easy access, and excursions for a significantly high number of cruise-ship passengers and visitors of the broader Athens area, in combination with the fast growing Araxos airport. The local justification of shorter, unexplored access paths through a cross-border strategy is propelling tourism competitiveness and access to destinations by including journeys through areas that have been identified as depressed regions (EOT, 2003). The strong potential of such a diversified network of cooperation and complementarity between rail services and tourism destinations further extends the competitiveness approach in respect to regional development. In this perspective, rail is a combined economic activity that benefits from mutual externalities as an efficient supplier to the transport source that sustains tourist destinations. Those externalities and direct economic benefits include pools for labor, tourist spending and diversification of rail passengers and raised interest from rail-operators, together with social and cultural effects for environmental awareness (Pessoa, 2013).

3.2.1 Cruise-Train

Taking forward the train by boat scenario, and against the growing concern for the promotion of a balanced growth in rural tourism, railways are recognized as alternative means that can contribute to sustainable tourism by enabling the survival of rural rail transport which -against the car- has strong credentials as means of low emissions causing little fragmentation and bearing low land use requirements (Lane, 2016). Further to this, rail proves an important sustainability driver and a

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strong necessity to develop alternatives to the widespread availability of the private car which has monopolized rural tourism (Lane, 2016). As a developmental driver it can contribute to a balanced growth between inland and coastal areas. It is significant that inland destinations in Greece are less accessible than most coastal destinations that are served by a multitude of other transport means besides roads (i.e. sea cruises, boat services and air travel). Since 2016, Diversified Railway tourism products are getting a more coordinated monitoring via authorized bodies (UIC, <http://toprail.org>) suggesting that rail tourism as a driver will not only increase the visibility of transport service offerings but it will also provide a “platform enabling close collaboration between stakeholders and their customers to encourage railway tourism opportunities” (toprail.org). An evaluation of the existing metric network of the Peloponnese provides a possible asset for sustainable tourism towards the discussed direction.

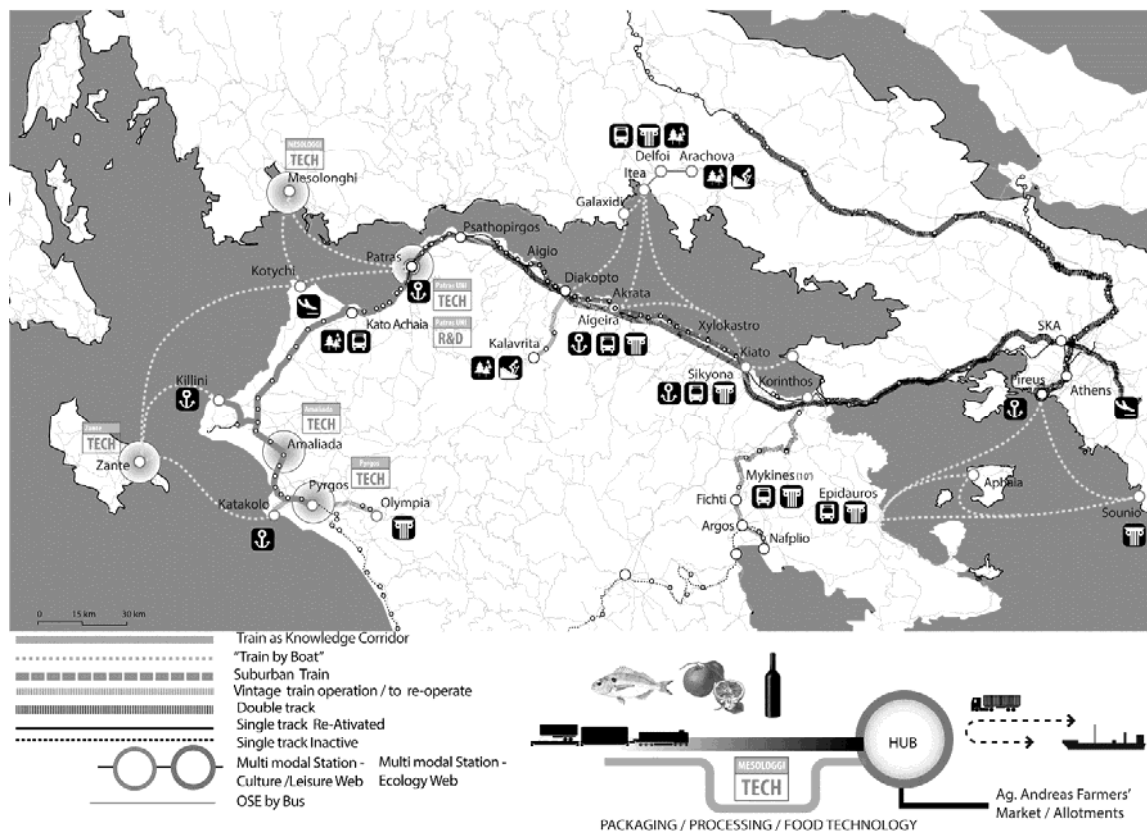


Figure2. Synergies developed between rail, knowledge economies and tourism networks

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A direct impact of accessibility in tourist destination choices and the importance of partnerships in the creation of successful tourist railway in the Peloponnese projects does not leave aside the importance of rail in heritage protection and conservation. Cruise-trains are at the core of this problematic, enabling advanced services that operate under an increased synergy and knowledge of nature and railway heritage.

More precisely, the currently neglected Peloponnese railway line has indisputable qualities. According to Theofanopoulos and Frezadou, these mainly concern: firstly, the quality of the railway network, which requires only minor improvements to re-operate on the existing metric gauged lines and secondly its vicinity to some of the most important destinations of archaeological, historical and cultural value (Theofanopoulos and Frezadou, 2016). These sites, connected by the railway also come across agricultural and gastronomic sites featuring vineyards and local products; and many cultural events: Epidaurus Ancient Theatre, Kalamata Dance Festival, and many others. The second parameter is of particular importance for the future improvement of the line. Along the line, or at least in its catchment area, there are a number of very important archaeological sites such as Mykines, Tyrinth, Epidaurus, Argos, Mantinea, Pylos, and Olympia. Alongside these seminal destinations are numerous sites of particular interest related to the contemporary history of Greece such as Dervenakia, Nafplion, Tripolis, Kalamata, Methoni, and Koroni as well as religious complexes and monasteries; impressive landscapes: mountains, coasts, caves, and picturesque areas that remain poorly accessible. Rail infrastructure itself poses some striking technical achievements: old stone railway bridges, old tunnels and steel constructions that also deserve their recognition as a world heritage site (Theofanopoulos and Frezadou, 2016).

The concept of Cruise-trains refers to the operation of the network not only on the basis of normal passenger routes, but on the possibility to operate alternative services (Theofanopoulos, 2015). Cruise-trains may be classified in thematic categories, depending on the areas to be visited and their emphasis, such as: archaeological theme trains, historical theme trains, gastronomic theme trains etc. This would operate much the way sea cruises do. More precisely, by enabling a "hop-on - hop-off" the train service intersected with outsourced services by facilities providing accommodation and leisure which will be certified according to the quality specifications (Theofanopoulos, 2015). In terms of the rolling stock, it may include modern trains, as well as vintage

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trains. The Hellenic Railways Organization has already initiated a project to repair and maintain older trains, with the financial support of private enterprises through the 'adoption' concept. In this programme, private stakeholders pay the costs of repair and maintenance and then 'adopt' the train as part of the company's social responsibility programme. In addition, the entrepreneurial model for the operation of the Cruise Trains may include the joint actions between the OSE, as the owner of the railway infrastructure, the GAIIOSE, railway operators, the regions of Peloponnese and Western Greece, as well as the private sector. These activities are based on feasibility studies and a search for the necessary financing sources (Theofanopoulos, 2015).

Conclusion

All synergies presented discuss competitiveness under the focus of proximity, local knowledge economy and regional specialization offering a rich framework for estimating multiple local dimensions and geographic specificities interwoven in the region's complex hinterland. These are the specificities within the broader social environmental and economic elements that a competitive railway redevelopment should be attached to. Notwithstanding the fact that there are essential dependencies between local geographic characteristics and their role in the shaping of localization economies and cooperation (Scot; Storper, 2003) the web of service ecologies allows as to consider rail integration, in a systemic and managerial way by identifying interrelated sets of factors within their regional dimensions that not only sustain rail service but further trigger its future performance. Such studied synergies remain highly relational and open-ended. Together with the respective decisions that drive them are internal to the system of the wider interactions and can be revised at any time into a joint sustainable service or performative process which assists all actors participating. The emphasis rests on a bottom-up resilient network setup of different configurations, with selective activation parameters able to describe a web of possible activities and not a top-down deterministic and predefined context of programmatic land-uses (Carydi, 2016).

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