

RAIL CONNECTED CITY-REGIONS: THE SIGNIFICANCE OF CONCERTED POLICIES AND ALTERNATIVE FUNDING OPTIONS

Alexandros Deloukas

Attiko Metro S.A.
adeloukas@ametro.gr

1. INTRODUCTION

Urban sprawl, road congestion and environmental deterioration have supported the view of a coordinated development of land use and sustainable mobility forms. Urban rail especially, constitutes the backbone of an environmentally friendly mobility system for metropolitan areas. It is widely accepted that an exclusive right-of-way enables rapid and reliable mass transit connections. A mutually supportive land use and urban rail planning would focus on the development of sub-areas which are more qualified for an access by rail. The concentration of various activities in suitable locations of urban rail interchanges ensures multiple synergies. First, higher densities enable increased levels of ridership and an improved share of public transport (PT). A compact growth justifies on the other side a higher level of PT service, expressed in frequency and/or network connectivity. Second, a variety of uses in close proximity at rail interchanges may suppress stand-alone trips and consolidate trip chains. An activity concentration in few nodal areas may lead to a trip shortening on the average. The overall effect is a reduction of car kilometrage traveled, energy savings, less accidents and traffic-induced pollution as well.

The paper conceptualizes the need of concerted planning policies to achieve a transit oriented development at the urban scale as well as a rail connected city-region. A parallel objective concerns creative mechanisms to finance such a development and the underlying rail infrastructure. Next to the conceptual part, a relevant case study is demonstrated. It refers to the best practice of the Swiss City-Rail project in Bern. Finally, summary conclusions are drawn.

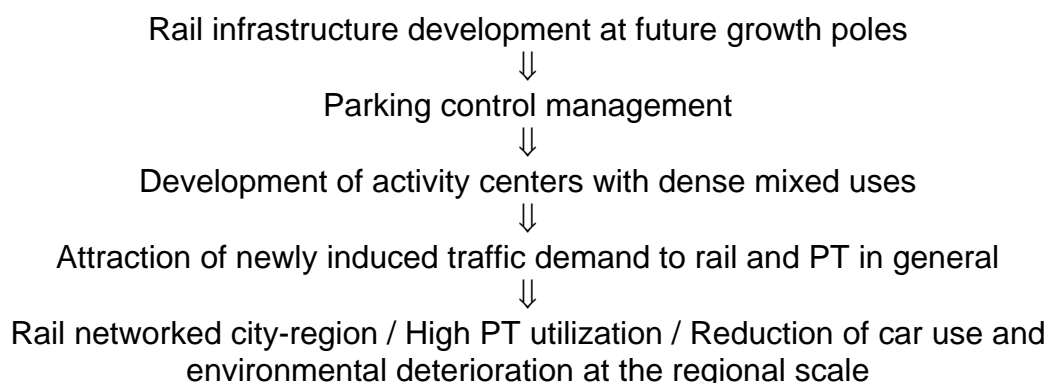
2. CONCERTED PLANNING POLICIES

The underlying concept postulates that a transit oriented development adds value to the utility functions of the main stakeholders. Passengers acknowledge i.a. intermodality comfort and time savings, transit agencies seek increased ridership and revenue generating opportunities, developers strive after increased returns on investment, and the community at large pursues urban regeneration and enhanced environmental conditions.

Previous research on land value gains due to urban rail investments provides useful insights for effective planning actions. Singular factors such as rail station proximity or dense mixed uses are only part of a wider set of impact variables with lagged and compound effects (FORREST et al. 1996, WEINBERGER 2001, CERVERO 1994, DU and MULLEY 2006). The macro-connectivity of the city-region by rail is an important site factor expressed as the service frequency of the station or as the number of destinations directly served by the said station. The neighborhood quality indicated through the density of green amenities and/or crosswalks is a close proxy of a pedestrian-friendly environment. The distinction of the above mentioned factors is based on quantitative methodologies such as the hedonic price modeling, geographically weighted and spatial regressions.

The planning practice acknowledges the significance of further guidelines, however. It is clear that a bus feeding system stretches the station catchment area and enhances the network connectivity. An urban rail alignment which follows arterial medians may disable a transit oriented development. The definition of parking requirements close to stations is, on the other side, a highly contested matter. Overseas, a generous parking supply is seen as an instrument to attract developers. In Central Europe, planners define maximum parking requirements in reverse proportion to PT accessibility, expressed as a combination of PT frequency and proximity. Base components of the latter parking policy is the joint consideration of private and public parking supply as well as the constraints on commuters and long parkers in favor of short parkers, such as visitors and shoppers.

Modal choice exhibits a significant behavioral inertia. A behavioral change is very difficult, even when the constraints of an initially car-dependent environment loosen through the provision of PT service. Therefore, the behaviorally correct sequence of planning actions to achieve a transit-oriented development is the following:



The particular sequencing of planning actions maximizes the desired impacts. Tight parking control or activity development without prior PT provision would dislocate potential shoppers or enhance car dependency respectively.

3. REVENUE GENERATION INSTRUMENTS

It is possible to distinguish two broad, non-traditional mechanisms to support financially urban rail and transit oriented development. The first pertains to revenues from joint development surplus. Joint development refers in this respect to a mutually beneficial collaboration of public (e.g. rail agency, local authority) and private parties (developer, lender, and landholder) to advance i.a. comfortable Transfer Stations ('station as a node of intermodality') or liveable urban sub-areas within walking distance of stations ('station as a place'). The second refers to revenues from land value surplus taxes (SCHEURER et al. 2000, DOHERTY 2004). Both instruments rely on land value gains due to rail proximity. Such value gains create external (indirect) benefits to private parties due to the public investment in rail infrastructure. Sharing or partial recapturing of the incremental value created could internalize some of the external benefits. A fair surplus portion may correspond to the unique contribution of the rail proximity on the land value.

3.1 *Joint development of transfer stations*

A transfer act is typically inconvenient, inducing additional effort for the passenger. Within the framework of the Metro Development Study conducted by Attiko Metro in Athens, a stated choice experiment has been performed (SPANOS, DELOUKAS and ANASTASAKI 1998). The experiment revealed that the disutility of one transfer in the local context was equivalent to 10 minutes of in-vehicle time. The low transfer comfort at that time resulted into a high transfer penalty. Transfer Stations (T.S.) may reduce significantly the disutility of transfer passengers. The joint development of T.S. awarding a concession to a private party is a way which may reduce up-front expenses and the overall burden of the public sector.

Compared to the transport sector in the narrow sense, Build/Operate/Transfer concessions in the real estate sector are normally longer (for T.S. up to 50 years), due to the different risk profile. A lease of a publicly held land parcel to the private developer is an opportune financial injection in-kind in this respect. The main revenue generators of a T.S. are commercial uses, parking charges or advertisement fees.

It is important to control the feasibility of commercial uses within the T.S. and the corresponding min. station ridership in case of a prospective concession or operating lease. A stepwise investigation is further on suggested.

- Surrounding area analysis, investigating i.a. the competing commercial uses and the on/off-road parking supply in the neighborhood.
- Forecast of the station ridership by period
- Throughput of the bus feeders intercepting the T.S. area
- Access modal split for the station
- Commercial mix for highest and best transit use. The activities offered may decrease significantly the transfer disutility of many passengers.

- Purchasing share of station passengers. In the Manchester Metro link case, the particular share amounts to 5% on the average.
- Consumption figures per purchasing passenger, In the same case study, the mean figure amounts to 6 Euros. Consumption figures indicate the expected revenues from lease rents.
- O&M expenses, depending on the contractual architecture: concession vs. management vs. lease contract.

A suitable legal framework for the joint development of T.S. is of great significance. The Greek Law 3010/2002 on T.S. for instance, speeds-up considerably land acquisition and approval processes, allowing a variety of commercial uses at T.S. sites as well as the granting of a density bonus. No provision is made, however, referring to an extension of the opening hours for commercial uses.

3.2. Joint development around urban rail stations

The very idea of a joint development around urban rail stations relies on the prospective benefits of private investors, lenders and landholders from increased returns or augmented land values respectively. As public promoters figure the transit agencies and the authorities at the municipal, national, even EU-level (as grantors). The investigation of the real estate (RE) market by sector within walking distance of the station is a first step to control the pertaining feasibility. Relevant sectors refer to retail, entertainment, office and residential uses. Available free spaces, potential green amenities, brownfield sites and other urban regeneration opportunities are of particular interest. Taxation and local planning barriers must be also considered.

The basic aim of the joint development is the dense concentration of mixed activities within walking distance of the stations, while expanding public spaces and green amenities. It should be noted that the urban regeneration task is facilitated by a visible, street-level rail system.

Two distinct types of structural actions enable a compact growth around suitable stations. In suburban greenfields, the land reserves and the margins for a new development are larger. In Attika, suitable interchanges lie largely along the OSE Greek Railways corridor Piraeus-Athens-Aharnes Rail Center (SKA). Examples are the main OSE hub in Aharnes (SKA), Votanikos, where metro Line 2 intercepts with the suburban rail, as well as Neratziotissa, where the suburban rail intercepts metro Line 1.

In built-up areas, a recycled development is more appropriate, fitting better to the urban regeneration task. A re-zoning may be combined then with a preservation of the existing residential use (for example, through a quota regulation) and a renewal of the building stock. Many rail interchanges in the periphery of the inner city are suitable in this respect. Examples in Athens refer to Attiki, where metro Lines 1 and 2 intercept and to Neos Kosmos, where metro Line 2 intercepts with the tramway.

A compact growth around stations favors a rail networked city-region, relieves tertiary pressures on central areas and redirects the diffusion of services off residential neighborhoods. Station areas are not any more simple transitional spaces but poles of a more self-reliant growth (BERTOLINI and SPIT 1998). The transit agency herself may be active in the RE market, purchasing land at lower prices on time, i.e. before the rail investment takes place.

Alternative funding options for the joint development around stations refer i.a. to Real Estate securitizations and Real Estate Investment Trusts (REITs). The securitization of future inflows from mortgages is practiced in Greece, based on the Law 3156/2003. REITs are indirect property investment vehicles enjoying tax exemption of RE transactions, RE ownership and RE income. By 2005, the capitalization of REITs in Europe amounts 30 billion Euros. In Greece, two REITs went public already, based on the Law 2278/1999. The law requires for obvious reasons a frequent RE re-valuation.

3.3. Value recapture tax

The taxation of private value gains due to public investments is an alternative mechanism to support financially urban rail and transit oriented development. Three important tax instruments for value recapturing are distinguished.

Location benefit tax: The tax is paid on a recurring basis by landowners within walking distance of stations. The payment takes place after the opening of the infrastructure. It is calculated as a percentage increase on property or RE ownership tax, so that no extra tax is raised. The tax encourages a productive use of vacant parcels. A periodic RE re-valuation is necessary, however. The value recapturing is slow but substantial. A legislative action is needed to earmark the surplus tax for transport investments. On the other side, an earmarking justifies the surplus tax as a fair way to compensate for public services offered by the community as a whole. A single landowner generates land value only at the very margin, if at all. It is suggested moreover that accessibility benefits are capitalized into land, not buildings (CERVERO and DUNCAN 2002).

Business tax rate: The tax is paid on a recurring basis by business occupiers of properties within walking distance of stations. The payment takes place after the opening of the infrastructure. It is calculated as a percentage increase on business income tax, so that no extra tax is raised. DEBREZION et. al (2006) mention that rail proximity has a more intensive value impact but a smaller distance impact on commercial properties, compared to residential properties. The surplus tax is justifiable due to improved rail access for employees and customers. However, the economic development is affected more by an income tax than by a property tax. A legislative action is needed to hypothecate the surplus tax for transport investments.

Planning gain: The tax is a one-off charge paid by landowners or developers in case of a hand-over or of granting planning permissions around rail stations. A scaled fee may be set in relation to the value of the transaction or of the project to be developed. The fee encourages a public-private

collaboration and deters land speculation. Addressed are sales transactions and permissions for up-zoning, re-zoning or buildings. The limited circle of addressees affects the revenues to be generated. A legislative action is needed to raise a new earmarked tax on planning gains.

4. CITY-RAIL PROJECT OF BERN

The most sustainable scenario for the spatial development of employment in canton Bern foresees a concentrated job growth around two new rail stations within the limits of the city of Bern. The two growth poles and the corresponding stations lie in Ausserholligen, west of the city centre, and in Wankdorf, east of the city centre. The integral planning foresees the advancement of the radial S-Bahn lines, terminating in the Central Station, to through lines, along with higher service frequencies. In this way both growth poles are connected through the city centre by rail ('City-Rail'). Tramway and bus feeders expand the 'within 30 minutes' PT accessibility to a population of 250.000 residents.

The state of both sub-areas before any intervention and at the 2020 planning horizon is briefly described. In the 'before' state both 'intermediate' sub-areas contain extensive industrial uses and land reserves. By 2020, each growth pole will comprise 600.000 sq.m. Gross Floor Area (GFA) following a staged densification strategy (i.e. doubling of the GFA ratio from 0,7 to 1,4). Taking Ausserholligen as an example, the functional mix foresees (as GFA-percentage, excluding green and public amenities) 22% housing, 18% industrial and 60% service uses or 3.500 residents, 1.500 industrial and 9.300 service jobs. About 70.000 daily trips will be accommodated to 45% by rail (S-Bahn and tramway), 25% by bus and 30% by car. This modal share is supported by a restrictive parking supply with reduced max. parking requirements. For private parking are foreseen 0,8 space per dwelling, 0,1 space per employee and 0,4 visitor space per 300 sq.m. of non-housing GFA. The figure for the visitors is already cut down by 60% due to the excellent PT service of the growth pole.

The development is based partly on a Property Planning Partnership. Rail agencies, municipal and cantonal authorities being the promoters and superb coordinators, are collaborating with private developers on the base of negotiated 'Infrastructure Agreements'. Landholding developers voluntarily contribute up to 40% of their surplus value gains. It is anticipated that about 25% of the expenses of the PT infrastructure in the growth poles will be recovered by value capture revenues. A parallel objective is an attractive urban design and landscaping. Parcel-based projects which come out of architectural competition gain a 10% density bonus.

5. CONCLUSIONS

Sustainable growth and transit oriented development are gaining considerable attention as planning paradigms. Their success will greatly depend on

creative forms of financing of such a development. The study displays how transport policy should be supplemented by a regional development strategy seeking to channel growth into rail-served corridors. The paper reviews the existing literature providing evidence that, *ceteris paribus*, rail proximity increases real estate values. The study has included a (chrono)logical sequence of planning actions and a summary of guidelines for concerted policies that could be used in an integral planning approach. A systematic approach is outlined further for addressing alternative revenue generating sources for the financing of urban rail and transit oriented development. Finally, the rich experience of a rail city in Bern has been demonstrated.

References

- BEIMBORN E. et.al. (1992), "Transit-based Approach to Land Use Design", Transportation Research Record 1349, TRB, Washington D.C.
- BERTOLINI L. and T.SPIT (1998), "Cities on Rails", E & FN Spon, London
- CERVERO R. (1994), "Rail Transit and Joint Development", JAPA, Vol. 60, No.1, pp.83-94
- CERVERO R. and M. DUNCAN (2002), "Transit's Value-added Effects", Transportation Research Record 1805, TRB, Washington D.C.
- DEBREZION G., E. PELS, P. RIETVELD (2006), "The Impact of Rail Transport on Real Estate Prices: Empirical Study of the Dutch Housing Market", 85th Transportation Research Board Annual Meeting, Washington D.C.
- DOHERTY M. (2004), "Funding Public Transport Development through Land Value Capture Programs", New South Wales University, Sydney
- DU H. and C. MULLEY (2006), "The Relationship between Transport Accessibility and Land Value: a Local Model Approach with Geographically Weighted Regression", 85th Transportation Research Board Annual Meeting, Washington D.C.
- FORREST D., J.GLEN, R.WARD (1996), "The Impact of a Light Rail System on the Structure of House Prices. A Hedonic Longitudinal Study", JTEP, Vol. 3, No.1, pp.15-29
- SCHEURER J., P. NEWMAN, J. KENWORTH, T.GALLAGHER (2000), "Can Rail Pay ? Light Rail Transit and Urban Redevelopment with Value Capture Funding and Joint Development Mechanisms", ISTP, Murdoch University, Perth
- SPANOS I., A. DELOUKAS, A. ANASTASAKI (1998), "A Stated Choice Experiment: Value of Travel Characteristics in the Context of Attica", 8th IFAC Symposium on Transportation Systems, Eds. M. Papageorgiou and A. Pouliezios, Vol.1, Pergamon, Elsevier

WEINBERGER R. (2001), "Light Rail Proximity. Benefit or Detriment in the Case of Santa Clara Community, California?", Transportation Research Record 1747, TRB, Washington D.C.