



3S RECIPE - Smart Shrinkage Solutions Fostering Resilient Cities in Inner Peripheries of Europe

PORTO (PT) POLICY BRIEF #2 • COMPACT CONNECTED CITY

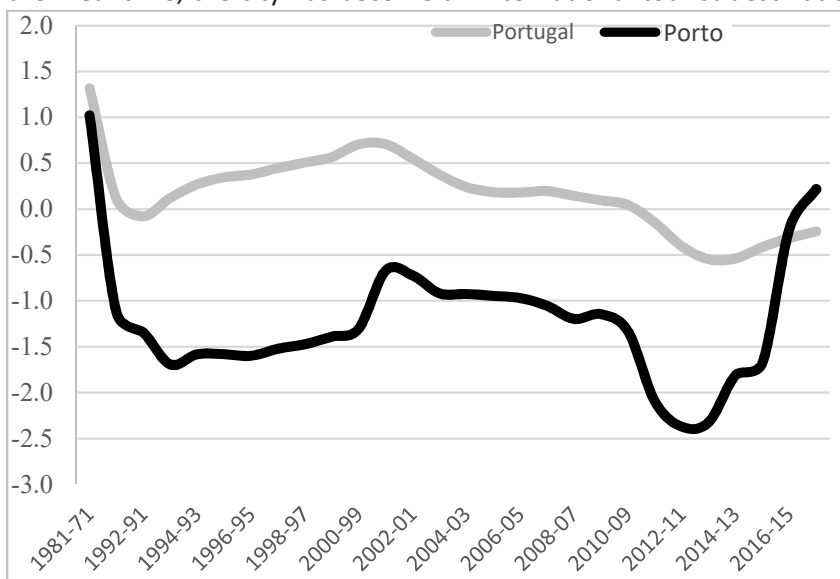
EXECUTIVE SUMMARY

This policy brief makes evident the positive impacts of the introduction of an **underground metro network** in the city of Porto in terms of a compact and connected urban development. Porto shows a structural population decrease and an economic restructuring process towards a tourism-oriented services economy. Building on local knowledge and the stakeholders' experience in implementing this project, this brief reveals the importance of **integrated transport systems** to make cities denser and improve territorial and socio-economic cohesion. The key lesson learnt is that **core cities**, such as Porto, **must be contextualized as the centres of their metropolitan areas** and interwoven into a complex set of interactions **allowed by the supra-municipal (regional) design of a metro network**. The brief offers a set of policy recommendations on enabling mechanisms for an effective metro network delivery, while dealing with territorial imbalances and social segregation in urban shrinkage contexts.



INTRODUCTION

The city of Porto endured a structural loss of residents (112,000 since 1980). This fact, together with indicators such as the unemployment rate (10.1% versus 6.9% metropolitan or 5.4% national) or the percentage of vacant houses (19% in 2011), characterize it as a shrinking city. In the meantime, the city has become an international tourist destination. This process has transformed its productive model, as well as its urban and residential dynamics. Moreover, Porto acts now as the core city of a vibrant metropolitan area, suffering the so-called centrality costs: commuting pressure on infrastructure and services. Both tourism and commuting prevent the proliferation of urban voids, as well as the underutilization of certain infrastructures, such as transportation. However, many residents have been displaced to the periphery due to the rising price of housing and *touristification*¹ of the historic centre and downtown area.



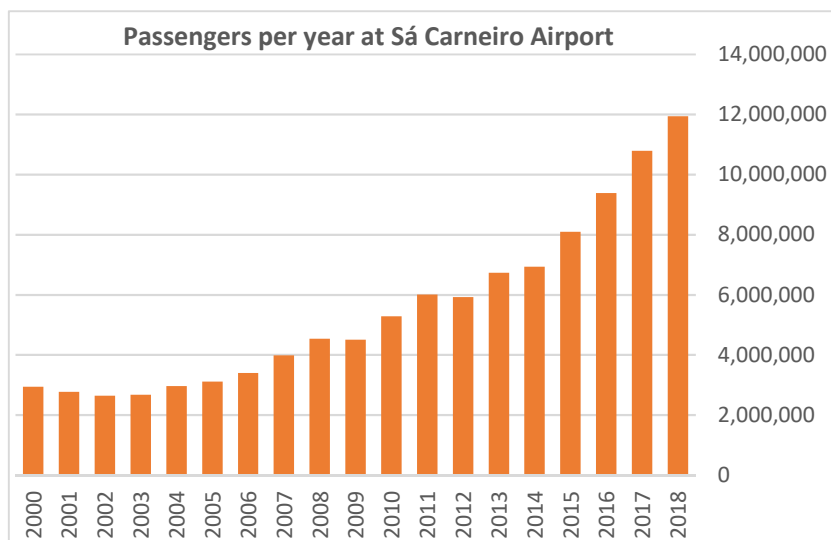
Moreover, Porto acts now as the core city of a vibrant metropolitan area, suffering the so-called centrality costs: commuting pressure on infrastructure and services. Both tourism and commuting prevent the proliferation of urban voids, as well as the underutilization of certain infrastructures, such as transportation. However, many residents have been displaced to the periphery due to the rising price of housing and *touristification*¹ of the historic centre and downtown area.

Portugal and Porto: annual average population change rates, %. Source: National Institute of Statistics (INE)

¹Touristification refers to the impact of mass tourism on the commercial and social fabric of neighbourhoods, causing services, facilities, and shops to be oriented towards and conceived of by reference to the tourist rather than the resident.

The expansion of the metro network, especially in the period 2002-2011, was a milestone for the mobility of people in the metropolitan area consolidating the central role of Porto. *Ryanair's* (and other low cost air carriers) arrival to **Francisco Sá Carneiro Airport** in 2009, with an investment of €140 million, explains the subsequent **tourism explosion** and the economic and socio-cultural revitalization of the city. Therefore, both infrastructures laid the foundations for the change of the urban economy.

Sources: *National Institute of Statistics (INE)* and *Airports of Portugal (ANA)*



THE METRO NETWORK AS AN INSTRUMENT FOR CREATING A COMPACT CONNECTED CITY AND FOR IMPROVING TERRITORIAL BALANCE AND SOCIAL COHESION

The *International Pre-Qualification Public Tender* for the design, construction, equipment, and operation of the **Porto Metro Light Rail System** was launched in 1994, finally opening the first line in December 2002. Since then, Porto's metro network has been expanding and increasing its passenger load up to 62.6 million in 2018. In this first phase, the network had only 11.8 km and 18 stations, all overground. At present, it is divided into six lines distributed throughout the city and the metropolitan area: Porto, Maia, Matosinhos, Póvoa de Varzim, Vila do Conde, Vila Nova de Gaia, and Gondomar, and also a funicular line, the *Funicular dos Guindais*, in Porto. It has a total of 82 stations spread over 70 km of duplicate commercial lines, mostly on the surface, with 9.5 km of underground network (see the full network's map on the last page).

In the current context of increasing housing prices in Porto accompanied by further population loss in favour of the wider metropolitan area, the metro network can be a means for urban densification. It allows establishing commuting links between the core city (Porto) and neighbouring municipalities, thus, dealing with some of the consequences of shrinkage. In this sense, the transport network is understood from the local government's perspective as a tool to re-balance the city.

The strategic masterplan for Porto Oriental, currently under development and pending final approval, proposes complete urban

Future Campanhã transport interchange (intermodal station)

Source: www.construir.pt

regeneration of the *Campanhã* area, noticeably more degraded than the Westside. The restructuring of the transport network, with the ensuing construction of a public transport interchange (intermodal station) and the expansion of the metro network, constitute a key factor in the urban regeneration process. This major infrastructure project, budgeted at €12.6m, will occupy an area of 24,000 m², comprising suburban



and long-distance trains, the Metro, the STCP urban bus network, as well as intercity and regional coaches. Through the improvement of accessibility and mobility, this plan – in combination with other large commercial privately-funded projects – should enhance social cohesion and increase urban density. An example of this approach is the reconversion of the former industrial slaughterhouse of *Campanhã*. After more than 20 years of abandonment, and following a €40m worth of private investment, *Campanhã* is set to become a multifunction mixed-used building, housing a commercial office block, an arts centre, several art galleries, an auditorium, an exhibition hall, and a platform ‘nest’ for local community social cohesion projects.

In order to highlight the on-the-ground factors driving Porto’s metro network expansion, we have applied the **Urban Futures Method** oriented to facilitate the exchange of opinions and reflections between the stakeholders (Lombardi *et al*, 2012). The purpose was to find, collectively and critically, the solutions, benefits, and conditions necessary to achieve smart shrinkage solutions. On 9 October 2019, six expert stakeholders in the field of urban development and mobility were gathered in a workshop held at the Faculty of Engineering of the University of Porto. Through a joint discussion, up to nine **benefits** associated with the metro network were identified, including (1) a reduction of motorized traffic and congestion (slowing down growth); (2) a reduction of car infrastructures; (3) a reduction of CO₂ emissions per trip and better air quality; (4) noise reduction; (5) more and superior public space; (6) an enhancement of public transport service; (7) reduced commuting travel times; (8) an increase in the number of public transport users; and (9) a positive image of public transport. Following this first collective exercise, the local stakeholders established six **necessary conditions**, classified into two groups (see below), so that the appropriate context allowed the smart shrinkage solution (metro network expansion) to achieve the benefits outlined above.

Necessary conditions for a successful implementation of a metro network

1. Integrated management & inter-modality	<ul style="list-style-type: none"> • Transport inter-modality: An inter-connected public transport network should include intermodal interfaces as platforms to connect people quickly and reliably • Integrated Transport Management System, including public and private operators • Parking management: Parking is an essential component of the transportation system that helps create more accessible and efficient land use patterns, and support other land use planning goals
2. Connectivity & Design	<ul style="list-style-type: none"> • Connectivity: the network should connect the main departure and arrival points and have the greater population coverage • Road space re-allocation • Good cost-benefit for the user

RECOMMENDATIONS: LEARNING FROM PORTO

➤ Address the expansion of the metro network from a socio-spatial standpoint

As a structural element of the built environment and a back bone of urban regeneration, the expansion of the metro network should aim at achieving urban compactness and social cohesion. An extensive public transport network also conditions socio-spatial aspects, such as mobility and residential choice, and influences the local economy by imposing the cost on municipal resources and effecting the local property value dynamics.

➤ Establish an integrated transport system that promotes sustainable mobility

Building on local knowledge and the stakeholders’ experience, design an integrated light rail network that incorporates other sustainable and/or low pollution and/or ‘soft’ modes of transport. The construction of a transport interchange (intermodal station) in a deprived part of the city has a positive multiplier effect, acting as an urban regeneration engine. Thus, in an urban shrinkage context, a compact connected city strategy can also result in territorial rebalancing.

➤ Processes that sharpen urban shrinkage can also mitigate some of its consequences

Touristification, studentification, and centrality costs may generate financial, housing, and other material strains for the city. At the same time, tourism-led growth and increased attractiveness of the core city and its higher education institutions may help to reduce (and potentially reverse) the detrimental consequences of urban shrinkage, e.g., the underutilization of social and technical infrastructure.

➤ **Do not lose sight of the metropolitan scale as a reference for urban mobility and accessibility**

The structural loss of residents in the core city must be contextualized within a process of displacement and suburbanization that, for the time being, benefits the wider metropolitan area. Nevertheless, Porto remains the central pole that generates centripetal flows based on labour commuting, consumption, and leisure patterns, family ties, etc. Therefore, the analytical focus should be broadened to understand how mobility dynamics and population redistribution processes unfold in a metropolitan context that goes beyond the administrative border of the central municipality.

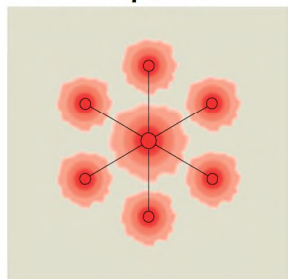
WOULD THE PORTO METRO DELIVER THE SAME BENEFITS WHATEVER THE FUTURE BRINGS?

A smart shrinkage solution may be strategic (e.g., designing a metro network) or detailed (e.g., expanding parking space at a park & ride railway station). Consequently, each of the initiatives has to be corroborated by the application of the 'smart shrinkage solution-benefit pair' methodology. This approach questions the sustainability of each proposal in future hypothetical scenarios. It is intended to estimate whether the initiatives proposed in relation to transport and connectivity in the municipality of Porto will be able to achieve the benefits indicated within a 40-year horizon, which is a cyclical regeneration period traditionally used in the area of urban development. Thus, four archetypal scenarios have been included to test the resilience of the smart shrinkage solutions proposed.

New Sustainability Paradigm (NSP)

Key driver: Equity and sustainability

Settlement pattern



Description

An ethos of 'one planet living' facilitates a shared vision for more sustainable living and a much improved quality of life. New socio-economic arrangements result in changes to the character of urban industrial civilisation. Local is valued but global links also play a role. A sustainable and more equitable future is emerging from new values, a revised model of development and the active engagement of civil society.

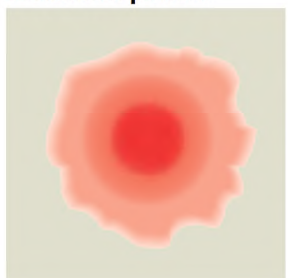
Philosophy

The worldview of the *New Sustainability Paradigm* has few historical precedents, although John Stuart Mill, the nineteenth century political economist, was prescient in theorising a post-industrial and post-scarcity social arrangement based on human development rather than material acquisition (Mill, 1848).

Policy Reform (PR)

Key driver: Economic growth with greater equity

Settlement pattern



Description

Policy Reform depends on comprehensive and coordinated government action for poverty reduction and environmental sustainability, negating trends toward high inequality. The values of consumerism and individualism persist, creating a tension with policies that prioritise sustainability.

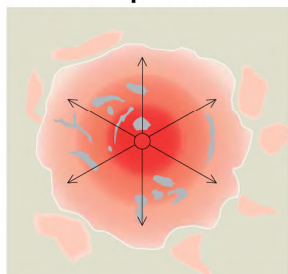
Philosophy

In *Policy Reform*, the belief is that markets require strong policy guidance to address inherent tendencies toward economic crisis, social conflict and environmental degradation. John Maynard Keynes, influenced by the Great Depression, is an important predecessor of those who hold that it is necessary to manage capitalism in order to temper its crises (Keynes, 1936).

Market Forces (MF)

Key driver: Competitive, open global markets

Settlement pattern



Description

Market Forces relies on the self-correcting logic of competitive markets. Current demographic, economic, environmental, and technological trends unfold without major surprise. Competitive, open and integrated markets drive world development. Social and environmental concerns are secondary.

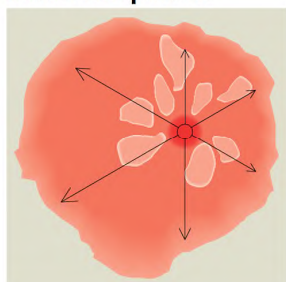
Philosophy

The *Market Forces* bias is one of market optimism, the faith that the hidden hand of well-functioning markets is the key to resolving social, economic and environmental problems. An important philosophic antecedent is Adam Smith (1776), while contemporary representatives include many neo-classical economists and free market enthusiasts.

Fortress World (FW)

Key driver: Protection and control of resources

Settlement pattern



Description

Powerful individuals, groups and organisations develop an authoritarian response to the threats of resource scarcity and social breakdown by forming alliances to protect their own interests. Security and defensibility of resources are paramount for these privileged rich elites. An impoverished majority exists outside the fortress. Policy and regulation exist but enforcement may be limited. Armed forces act to impose order, protect the environment and prevent a societal collapse.

Philosophy

The *Fortress World* mindset was foreshadowed by the philosophy of Thomas Hobbes (1651), who held a pessimistic view of the nature of man and saw the need for powerful leadership. While it is rare to find modern Hobbesians, many people believe, in their resignation and anguish, that some kind of a *Fortress World* is the logical outcome of the unattended social polarisation and environmental degradation they observe.

The **Urban Future Method** does not favour any particular scenario. Indeed, for a solution to be determined to be robust and resilient to future change, the necessary conditions to support the intended benefits being achieved over time must exist in all scenarios. Drawing on expertise, experience, and **knowledge of the local context**, we have graded the likely performance of a metropolitan light-rail's (Metro) necessary conditions in the future as follows:

Urban Futures Method applied to the construction of the metro network to promote compactness

Necessary Conditions	New Sustainability Paradigm	Policy Reform	Market Forces	Fortress World
Connectivity – The network should connect the main departure and arrival points and have the greater population coverage	Sustainable public transport options such as the metro are widely favoured, although there are some necessary changes to make the network shorter and more compact, avoiding urban dispersion	Construction and maintenance of sustainable transport modes and infrastructure is enforced through public investment and strong public policy incentives.	In a materialist and individualist world, people in general prefer to drive a car because it provides status, control, and autonomy. A metro network does not exist, because transportation is linked to economic profitability	The municipality of Porto (fortress) is disconnected from other surrounding municipalities. There is a shorter, denser, and better designed circular metro network. Private vehicle usage likely to increase outside Porto
Transport inter-modality – An inter-connected public transport network should include transport interchanges as platforms to connect people quickly and reliably	Transport inter-modality is necessary in terms of environmental, social and economic sustainability, offering benefits of reduced operation costs, energy consumption and emissions, and overall efficiency for moving people and goods around	Construction of transport interchanges is pushed through public policy which promotes inter-modality in transport planning decisions. The tension between local political interests, transport providers, and environmental and socioeconomic sustainability continues, nevertheless	Non-existent: collaboration between private transport providers only occurs when there are expectations of maximizing profitability	Transport interchanges exist inside the fortress to connect trendy modes of transportation for the wealthy
Integrated Transport Management System - including public and private operators	Integrated public transport is considered necessary in terms of environmental sustainability and energy efficiency. It takes many forms (e.g., coordination of timetables and frequencies; integrated ticketing; packaged transport services)	Integrated transport is a major policy goal pushed by the state actors, promoters, and mediators. The tension between local political interests, transport providers, and environmental and socioeconomic sustainability continues, nevertheless	Non-existent: collaboration between private transport providers only occurs when there are expectations of maximizing profitability	Integrated management only occurs inside the fortress
Parking management is an essential component of the	Parking is managed to encourage use of alternative non-	Parking management is promoted by policy makers, acting as promoters and	Car parking is used as a revenue generation tool that can fund parking	Parking is managed so as to increase liveability

transportation system that helps create more accessible and efficient land use patterns and support other land use planning goals	motorized modes and reduce individual transport use (thereby reducing traffic congestion, roadway costs, energy consumption accidents and pollution)	mediators. The tension between transport providers, key stakeholders, and local/municipal political interests continues	facilities, transportation improvements, or other important projects. It is a way of addressing problems for specific valuable 'players' (e.g. providing parking space in the central business district)	for the fortress residents
Road space reallocation is used to reduce car travel	Existing road space is reallocated to give more sustainable modes of transport priority and to severely restrict private car travel (e.g. 'road diets', cycling and bus corridors)	Policy makers try to resolve road space allocation liveability, spatial, capacity and network tensions, facing strong opposition from motorists	Under a private car-centric transport system, road space reallocation is not necessary, because more road space is built according to market demand	Road space is managed according to the needs of the inhabitants of the fortress (e.g. provision of cycle lanes or pedestrian improvements such as footpath widening)

Key: ■ condition highly unlikely to continue in the future ■ condition is at risk in the future ■ condition highly likely to continue in the future

POLICY IMPLICATIONS

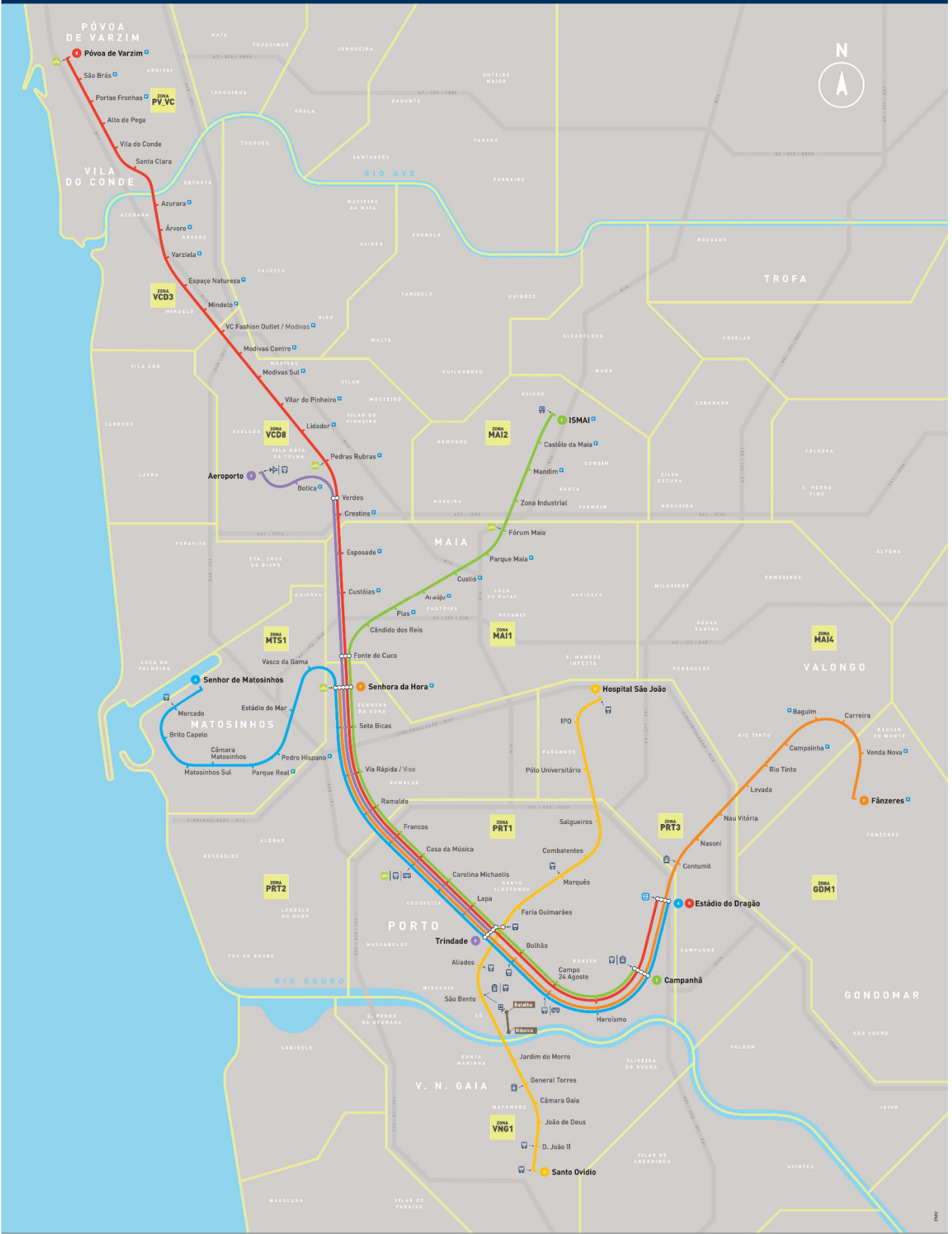
Planning an efficient metro network which fosters compact and connected urban development is a complex solution, requiring a number of necessary conditions to be achieved, and with much ongoing debate on its capacity to deliver real smart shrinkage benefits. The analysis conveyed herein indicates that a metro network will deliver most benefits where social and environmental priorities drive policy and practice towards integrated and efficient transportation and land use planning (NSP and PR to a lesser extent). Tensions between local and national, public and private, and collective and individual interests can challenge success in mostly state-led initiatives (PR), and economic interests in more profit-driven societies can seriously hinder this kind of project development (MF). The urban areas and population benefiting from this initiative would certainly differ in the four scenarios (in FW, lesser coverage would be delivered). Nevertheless, having less area coverage, could probably better serve compactness goals and prove to be a more financially-sound solution. Generally, these results support building an efficient metro network to achieve a compact and connected shrinking city in the future in an ever changing world, providing certain conditions are met.

REFERENCES AND FURTHER READING

- Lombardi DR, Leach JM, Rogers CDF et. al. (2012). *Designing Resilient Cities: a Guide to Good Practice*. Bracknell: IHS BRE Press.
- Rodríguez-Barcón A & Sousa S. (2018). Declive demográfico y dinamismo turístico: análisis del discurso en torno a la contracción urbana en Oporto. In Guirao, C., Marín, C. and Gaona, C. (Coords.). *Los contenidos de humanidades como lectura multidisciplinar*. Barcelona: Gedisa.
- Sousa S and Pinho P (2015). Planning for Shrinkage: Paradox or Paradigm. *European Planning Studies*, 23(1), pp. 12-32, <https://doi.org/10.1080/09654313.2013.820082>



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- Parque Parking
- Park and Ride (Parque com tarifas reduzidas) Parking with lower charges
- Parque bicicletas Bicycle parking
- Autocarro urbano Bus
- Transportes alternativos Temporary bus service
- Autocarro inter-urbano Intercity bus
- Comboio Train
- Aeroporto Airport
- Funicular Funicular
- Fronteira de Zona Zone Boundary

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