

# **Regional Fast Rail and Regional Development: Irrigation or Desertification?**

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## **Abstract**

There is a distinct shift in Australian proposals for high speed rail (HSR) development. From the 1984 CSIRO proposal until recently, the focus of private and public sector HSR initiatives have been long distance intercity connections, typically including some or all of Melbourne, Canberra, Sydney and Adelaide. However, the Commonwealth's Faster Rail program is funding business cases that connect regional cities to the eastern seaboard metropolises, signifying that HSR is no longer seen as a transport solution, it is a panacea for metropolitan growth problems and regional city economies. This article outlines the theory and international experiences of HSRs propensity to 'irrigate' or 'desertify' the regions, and points to the need for more than just transport services to ensure positive outcomes for regional communities.

## **1. Introduction**

The history of high speed rail (HSR) in Australia can be seen as one of many plans but no action. There is a view without high speed rail we are missing something, which is underscored by a member of the reference group for the Commonwealth Government's 2010-2013 HSR study pointing out that "Australia is one of only two continents without HSR or plans for its construction – the other is Antarctica" (Budd, cited in *Beyond Zero Emissions 2014*, p. 4), and noted transport academic and former Infrastructure Australia Board member Professor Peter Newman (2016) stating "High-speed rail is needed. We are the last major developed area without it". Newman also suggests that as a well established technology, HSR may also replace car and air travel and therefore reduce greenhouse gas emissions (*ibid.*). While HSR proponents continue to emerge, there has been a shift from being based on improving the connections between the capitals on the country's eastern seaboard to fast rail as a solution to regional development and metropolitan population growth problems. This article presents a summary of the recent proposals for regional fast rail projects in Australia, including those recently funded to develop business plans through the Commonwealth's Faster Rail program. This is followed by a review of the literature relating to the development of transport technologies and the distribution of people and economic activity within regions. The final section provides a summary of the outcomes of HSR projects in England and France, chosen as their strongly monocentric morphologies are similar to those of Australian states.

There is not a settled agreement on what constitutes HSR. The International Union of Railways define HSR as at least 200 kilometres per hour (km/h) for upgraded track

and 250 km/h for new track” (cited Hensher, Li & Mulley 2012, p. 4). Givoni (2006) proposes a definition for HSR as “high capacity and frequency railway services achieving an average speed of over 200 kph”, which is a service rather than engineering standard. The average speed is important, as it introduces an account for the number of stops undertaken on the journey as a factor, given the requirement to slow down and accelerate for each one. Givoni also includes this as a critical factor in HSR as a regional development initiative, as a higher number of stops increases the economic development potential, but also increases the trip time and therefore the advantage of HSR over other transport services.

HSR proposals are not merely transport projects, but conceived as “part of a broader economic project, with industrial, regional economic, environmental, employment, export, and development aspects” (Ryder 2012, p. 304). In France, the regional outcomes of HSR are seen as ‘irrigating’ or ‘desertifying’ (Chen & Hall 2013), indicating that economic outcomes are not always positive. Experience from France and the UK indicates several factors in determining the outcome, including: the relative strength of the regional economies connected; the integration of the HSR within the regional transport network; regional economic development strategies; and, the concurrent redevelopment of the areas surrounding HSR stations. Given the spate of regional HSR proposals in Australia, these lessons are important for considering HSR development in Australia, as it suggests that transport alone is not enough to address the spatial imbalances and metropolitan-regional divergence that are fundamental to the argument for investment.

## **2. Regional Fast Rail Proposals in Australia**

### **2.1 Background**

In Australia, the Commonwealth Government has been regularly presented with or commissioned studies into fast rail projects in Australia since Dr. Paul Wild of CSIRO’s 1984 proposal for a 350km per hour service between Sydney and Melbourne (Newton 2016). Laird (2013) provides a summary of proposals, including: a 1994 proposal to link Sydney and Canberra; in 2000 the Commonwealth commissioned the East Coast Very High Speed Train (VHST) Scoping Study, linking Melbourne, Sydney and Brisbane; and, another Commonwealth study in 2010 for Sydney - Newcastle, with Canberra and Brisbane connections to be also investigated. In 2013, Prime Minister Kevin Rudd announced funding for planning a Melbourne, Canberra, Sydney and Brisbane service in the lead up to that year’s federal election (Griffiths 2013): the HSR Advisory Group responsible for the planning was disbanded by the incoming Abbott Government.

In 2012, the Australian Greens commissioned a report on HSR, prepared by the Cooperative Research Centre for Rail Innovation. In the introduction Adam Bandt, Deputy Leader, provided insight into why these proposals recur in Australian public life:

Imagine getting on a train in the centre of Melbourne and arriving in the centre of Sydney just three hours later. Along the way you will have access to the

internet, can use your mobile phone, move freely around the carriages and dine in a restaurant or café.

Regional towns on the outskirts of our great cities will be less than an hour away, transforming their role as economic centres.

Imagine a mass transit long distance transportation system that can be powered by clean and renewable energy and that reduces the impact of pollution and car travel on our cities and country (cited in Edwards 2012, p. 1).

While presenting a vision of fast and comfortable and productive inter-city travel, it also refers to the transformation of regional cities. Regional development has been considered as a benefit of fast rail proposals in the past (Williams 1998), but in the years following this statement the main concern of both public and private sector initiatives for fast rail has been the development of regional cities and towns and the mitigation of issues associated with metropolitan population growth. This shift from the longer distance intercity connections to shorter distance stopovers for political and regional development purposes aligns with recent trends in Europe (Garmendia et al. 2012). Australian fast rail dreamings have shifted from long distance interstate luxury to regional city commuting from places such as Newcastle, Wollongong and Geelong. Noted fast rail advocate and Member for Bennelong, John Alexander, sees a “perfect storm of opportunity to liberate those cities through high-speed rail” (cited in Koziol 2016).

## **2.1 Faster Rail**

The 2017 Commonwealth Budget included the Faster Rail program, providing \$20 million to develop three business cases for faster rail connections between capital and regional cities. The prospectus for the funding submissions outlines two types of development for consideration: new or extended lines that facilitate the development of new locations for housing and employment; and, improvements to existing services to support “affordable housing and job-rich centres that have good rail connectivity to the city” (Department of Infrastructure and Regional Development 2017). The problems that the Government is intending to solve through rail development are metropolitan population growth issues, through providing better access to metropolitan employment from regional areas (McCormack & McVeigh 2018, p. 154). Subsequent statements on the Faster Rail program by the Deputy Prime Minister and the Minister for Infrastructure and Transport provide the basis for this contention:

... we need to make sure that congestion in our cities is eased. We also need to make it easier for people in regional areas to commute to cities such as Brisbane, such as Sydney, such as Melbourne, so that they can enjoy the lifestyles of living in the wonderful electorates such as the one we are in here right now, and also enjoy city wages, city living, but to be able to get home in good time so they can enjoy time with their families (McCormack 2018a).

And, in relation to the success submissions for business case funding:

If these proposals prove to be viable, they offer the potential to significantly reduce journey times on these key corridors - meaning better options for people who want to have the lifestyle of a regional centre but access to the job opportunities of a big city (McCormack 2018b).

The three successful proposals are from New South Wales, Queensland and Victoria. The New South Wales proposal is for improved services between Sydney and Newcastle, reducing the service from 3 to 2 hours, which falls short of the one-hour travel time advocated for within the Illawarra community (Meyrick 2014). The Queensland based North Coast Connect proposal has been promulgated by 'Team Queensland', the 26 Federal parliamentarians from the state's Liberal National Party. The website indicates that the consortium undertaking the business case comprises SMEC, Stockland, Urbis and KPMG. The North Coast Connect proposal is for 45 minute services between Brisbane and Nambour, and Brisbane and Maroochydore (North Coast Connect n.d.).

The Victorian proposal is particularly ambitious in scope and concept. Submitted by Consolidated Land and Rail Australia (CLARA), it proposes to pay for a fast rail link to a new city to the north of Melbourne through value capture, based on the uplift from converting agricultural to residential land. The new city is to be located near Shepparton, and would be the first of an ambitious plan for "eight of the world's most advanced, sustainable, SMART, greenfield cities" located on a HSR link connecting Melbourne, Sydney and Canberra (CLARA 2016). While there is limited detail available on the economic case for CLARA, at least until the completion of the Commonwealth funded business case, the capacity for such an expensive project to provide a positive return on investment through value capture has been questioned (Clifton 2016; Newman 2016).

## **2.2 Other Proposals**

In addition to the three proposals included within the Faster Rail funding program, there are a number of other regional fast rail proposals under development in Australia. When taken together, these proposals point to a paradigm shift in Australian fast rail proponents in recent years, with State Governments, NGOs and private consortia developing plans for connecting regional cities and State capitals with HSR services.

There is particular interest in HSR services in Victoria. In 2018 the Victorian State Government announced the \$50 million for investigations into fast rail between Melbourne and Geelong, the state's second largest city. The plan is to tie in the Geelong service with the proposed Airport Rail Link, for which planning has been funded Commonwealth and State Governments (Allan 2018). This is in addition to the \$1.7 billion State and Commonwealth funded Regional Rail Revival program, which will upgrade the state's passenger services (Rail Projects Victoria 2018). Another proposal, Mega Rail, is a private sector proposal for a bullet train service running from Geelong, through the central city, and on to Dandenong on the Melbourne's southeastern fringe. The expected travel times are faster than other proposals: 17 minutes between Geelong and Melbourne, and 13 minutes between Dandenong and Melbourne. Estimated to cost \$15 billion, the proposal lists benefits

to regional employment, particularly for the Latrobe Valley; reduced emissions; and somewhat contradictorily, access to affordable housing as well as increasing property values. The project was unsuccessful in its Faster Rail submission, but has stated an intention to keep developing the proposal (Mega Rail 2018). Also, the Rail Futures Institute (2016) include faster rail services in its proposal for redistributing population to regional Victoria, such as by 2040 have 35 minute services to Geelong and 60 minute services to Ballarat.

The Committee for Sydney (2018) recently published a report on linking Wollongong, Sydney, the Central Coast and Newcastle – called the Sandstone Mega-region. The report notes that to be successful, the train service times need to be less than one hour, and that mega-regions require a “coherent economic strategy with complementary, rather than competitive, roles for each of the centres” (ibid. p. 13). The planning for the region as a series of well-connected centres includes a single housing market, facilitated by a greater access to employment across the region, and increased productivity through the agglomeration benefits. It is worth noting that the analysis of the proposal forecasts an additional 40,520 dwellings in the non-Greater Sydney portion of the region by 2036, which is marginal in comparison to the 1.85 million dwellings within Greater Sydney. For employment, an additional 11,825 jobs are forecast across Wollongong, Gosford and Newcastle, but increases for Sydney and comparisons to existing figures are not included (ibid. p.22).

Regional fast rail has also been suggested for South Australia and Western Australia, with lines emanating from Perth and Adelaide included as possible developments within the Faster Rail prospectus (Department of Infrastructure and Regional Development 2017). Blandy and Michell (2016) promote fast rail as a way to decant the South Australian population from Adelaide, home to approximately 80% of the state’s population, and also note that the state’s flat topography reduce the costs and engineering costs of the proposal. In Western Australia there is some support for a Perth to Bunbury fast rail service, which is seen as a vote-winner in regional areas (De Poloni 2017). While not as developed as the other proposals included in this summary, it indicates a groundswell of regional fast rail interest in Australia.

### **3. Transport and the distribution of people and employment in city-regions**

Improvements in transport and communications change the distribution of people and economic activity in city regions. While there is a view that reduced travel times or telecommuting will reduce spatial inequities. The belief is that better transport will enable people to live in rural communities and maintain metropolitan employment, or enable businesses to live CBD premises. However, economic geography literature predominantly predicts the opposite effect (Broad & Cavanagh 2006; Florida 2005; Glaeser & Gottlieb 2006; Hall 1996; Scott 2006; Simmie 2010). Major cities have gotten larger as transport and communications have improved, as Polése (2013, p. 11) observed:

Falling transport and communication costs are powerful drivers of concentration. Again, it’s an old story. Every new wave of innovation - the

steamboat, railways, the telegraph, the telephone, the automobile, paved roadways, air travel, etc. - has ushered in a new era of urban growth. Fundamentally, there is no difference between the arrival of the telegraph in the mid-nineteenth century, the telephone a century ago, and the Internet and email today.

A detailed analysis of the impact of transport improvements in the Mezzogiomo region of southern Italy found that reduced transport costs benefited the north. As northern Italian manufacturing benefited from increasing economies of scale, the conclusion was that an increase in demand for goods in the Mezzogiomo would lead to an increase in importing goods from the North, and “unambiguously cause a decrease in domestic supply” (Faini 1983, p. 278). That is, improved transport connections lead to greater demand, but lower employment, providing an example of the concentrating effects outlined by Polèse. However, there is also a countervailing trend towards greater population dispersal, an expansion of the metropolitan commutershed as people are able to travel further within their self-determined travel budget. Given these opposing patterns, Rietveld and Bruinsma (2012, p. 63) conclude that as a result of transport improvements “welfare improving effects for households are larger than the productivity improving effects for firms”. These relationships between transport and the distribution of people and employment are central to considering a case for regional HSR developments.

### **3.1 Transport and counterurbanisation**

Developments in transport have been connected to the growth of cities, in terms of their geographic extent as well as population. Hobsbawm (2010) considers the development of rail transport, in conjunction with international wire communications, during the mid 19<sup>th</sup> century as leading to more populous cities, creating global hubs of global trade and communications. Improving transport infrastructure and people’s increasing access to flexible work arrangements were identified as two important factors in increasing exurban housing choices in 1990s Australia and the United States (Burnley & Murphy 1995; Renkow & Hoover 2000). Metz (2010) found similar trends in a study of commuting over a 35-year period in Great Britain, concluding that improvements to transport infrastructure lead to increase travel distances, rather than reduced travel times. It is of note that the development of regional fast rail services in Australia is couched in terms of enable commuting from regional areas to work in the big cities.

These processes of transport and increased commuting distances are not new, reflecting processes of expanding metropolitan suburbanisation since the 19<sup>th</sup> century. Brooklyn is the prototypical commuter town: the first ferry to New York opened in 1836, growing to 1,250 services per day by 1854. This expanding ferry service was associated with the population growing from 2,378 at the beginning of the 19<sup>th</sup> century, to 15,394 in 1830, and by 1850 it was just short of 100,000 (Jackson 1985, pp. 27,8). By 1860 40% of the Brooklyn workforce commuted to New York, and it was a lifestyle for the privileged, as “they tended to be above average in wealth and position” (ibid.). This growth occurred on the outskirts of cities across the United States, where streetcars and later railways connected new suburban settlements populated by the middle class fleeing disease and crime in the heart of the city. Rail

lead city expansion is also evident in Melbourne, as new rail networks in the 1880s enabled the land boom and the development of disconnected and sprawling suburbs (Cannon, 1966). Similar processes occurred in Sydney, as the development of the train line south to the Illawarra initially intended to transport coal became the focus of residential land speculation and subdivision (Muir 1987).

In the 20<sup>th</sup> century car ownership became widespread, increasing the distances spanned by cities and their satellite communities (Davison 2004; Jackson 1985; Lang, LeFurgy & Nelson 2006; Newman 2003). McKenzie (1933, p. 67) presciently observed not only the expanding influence of the city, but also the increased concentration of specialised services:

The coming of the motor vehicle and the paved highway, the expansion of the press and other agencies of communication have brought the city and its hinterland into a closer functional relation... The metropolitan region ... is essentially an expanded pattern of local communal life based upon motor transportation... Certain functions, notably communications, finance, management and the more specialised commercial and professional services, are becoming more highly concentrated in or near the centre of the dominant city.

This is similar to what occurred in Australia, whereby the prevalence of the car as personal transport has been linked to the decline of the number of towns of population less than 1,000 during the twentieth century, while regional cities and the metropolitan areas grew (Bureau of Infrastructure Transport and Regional Economics 2014; Smailes 2000).

There is a cultural dimension to the growth in exurban living, as Jackson (1985, pp. 43-4) observes that while it has been prevalent in the US, European cities remain relatively dense. Therefore, as much as transport and telecommunication improvements have enabled people to live at greater distances from their place of work, it is not the only factor.

### **3.2 Economy and Employment**

Standard economic modeling does not cope so well with events that affect an economy in the medium-run: the shocks set a new path for a region (Storper 2017). The introduction of a HSR service to a major city can be seen as a shock to a regional economic system: regional residents can access a wider range of employment, and an increased range of competitors for their patronage, while metropolitan residents may consider regional housing options and maintain city work. The trade areas of businesses and other services may increase due to the lower costs of servicing a greater population, but similarly expose them to greater metropolitan competition. This increased competition fostered by improved transport connections may be seen as a positive from a classical microeconomic perspective as it will engender greater efficiency, but if fast rail services are a regional development initiative then the distribution of benefits between metropolitan and regional areas is important consideration.

It is also of note that cities connected into global markets, such as Sydney and Melbourne (Globalization and World Cities Research Network 2016), have grown substantially in recent decades through cumulative causations processes. Large and wealthy cities with the best telecommunication and transport infrastructure become the most profitable places to invest, creating reinforcing cycles of growth and development and indicating diverging prosperities between global cities and regional hinterlands (Dicken 2011; Friedmann 1986; Storper 2017; Storper & Scott 2016). In particular, Sassen (2001, p. 16) argues that:

... the more globalised the economy becomes, the higher the agglomeration of central functions in relatively few sites ... The extremely high densities evident in the business districts of these cities are one spatial expression of this logic. The widely accepted notion that density and agglomeration will become obsolete because global telecommunications advances allow for maximum population and resource dispersal is poorly conceived. It is ... precisely because of the territorial dispersal facilitated by telecommunication that agglomeration of certain centralizing activities has sharply increased.

The salient point is that improvements to transport and communications technology have generally lead to greater concentrations of economic activity in the cities that form the network hubs (Chen & Vickerman 2016). As a generalisation, the greater the initial imbalance between the larger and smaller settlements connected by fast rail, the more the benefits will occur in the larger settlement, due to the increasing returns to scale due to the agglomeration economies in large cities. As the costs of providing goods and services, of which travel time is a major part, declines through improved access to regional markets the competitive position of central city firms improves. While this is also the case for regional firms accessing the city, the agglomeration benefits indicate that metropolitan businesses will be more efficient and therefore win out over regional competitors (Fujita & Krugman 2004, p. 155; Puga 2002).

There is also evidence that suggests being proximate to a primary city may reduce the range of goods and services in regional centres, indicating the affect of competition (Beer & Clower 2009, p. 383; Puga 2002, p. 401). This is an *agglomeration shadow*, where the activities within the larger city crowd out the development of industries in smaller, nearby areas. Agglomeration shadows provide an explanation why more remote communities may retain a wider array of functions, as only at larger distances from the larger city where transport and labour costs become more substantial factors is there sufficient market potential to support additional iterations of first city functions (Fujita, Krugman & Venables 2001; Krugman 1998; Redding & Turner 2014). The agglomeration shadow concept is closely related to the formative settlement hierarchy theories of Christaller (1933 [1966]) and Lösch (1940 [1954]), where higher order functions only occur in central places where there is a large enough range and threshold to sustain business activity, while the lower order places between the larger activity centres only offer a reduced range of basic requirements (Cardoso & Meijers 2016; Chen & Vickerman 2017).

The extreme of this proposition is to cut services, such as in nineteenth century France where it was proposed to put a break of gauge in a regional rail service to increase regional employment (see Dobes 2017), but this does not take into account that there are benefits to connectivity. Some jobs will follow as a result of regional population

growth enabled by commuting, as the resulting flow of incomes to regional areas can be important in sustaining regional communities (Lavesson 2015; Parr 2014; Partridge, Ali & Olfert 2010). Bar-El and Parr (2003, p. 120) concluded that employment growth did follow population growth in non-metropolitan areas, however the process is slow. This can be attributed to the higher incomes of regional residents who travel to metropolitan-based work in comparison to their regional working neighbours. However, another study of the outcomes from a train service between regional areas north of Uppasala and Stockholm did not find substantial employment or income growth as a result of commuting (Åslund, Blind & Dahlberg 2015).

The quality of rail service is also a factor in the liveability of regional areas, providing non-car options to access metropolitan services, entertainment, employment and family and friends (Davern et al. 2018). Some balance is required, there may be a 'goldilocks' level of service: not so fast that it impacts on regional businesses, but fast enough to encourage population and associated employment growth as well as improve the quality of the lives of regional residents. This conceptualisation of a balance between regional accessibility and economic competition should also consider the high marginal cost of HSR over normal and medium speed rail networks, as well as the albeit dated contention that only two of the world's HSR services are profitable: Paris-Lyon and Tokyo-Osaka (Burnett 2009).

### **3.3 High Speed Rail and Regional Economies**

As discussed above, the literature points to the relative strengths of the economies being connected as an important factor in how improved transport connections benefit cities and regions. Examples such as the rail connections between the closely matched cities of the Randstad - Amsterdam, Rotterdam, The Hague and Utrecht – do not provide much insight into what the outcomes might be of HSR connections between unequal pairs such as Sydney and Wollongong and Newcastle, or Melbourne and Geelong. This is particularly the case as these regional cities transition from having distinct economies based on industrial specialisations, to service centres for their surrounding communities. European studies of polycentric city regions promote the importance of complimentary networked economies, while noting that creating a wider distribution of population without attendant functional distribution is inherently unsustainable (Hall & Pain 2006, p. 202). Therefore, examples of the effect of HSR on the distribution of employment and industry in strongly the monocentric regions of southeast England and the Paris basin are summarized here. In summarizing research on the impact of HSR connections to London and Paris, Chen and Hall (2013, p. 355) conclude that the primacy of the capitals remains, but "in France, the gap was reduced (albeit slowly), while in the UK regional inequalities actually widened". The salient factors in these different regional trajectories are of particular interest in light of the interest in regional HSR in Australia.

In an early investigation into the regional impact of the TGV between Paris and the Rhone-Alps region, Bonnafous (1987) considered the impacts on tourism and service industries by surveying businesses before and after the line's opening. For hotels located close to the rail head, overnight stays had declined as business trips transferred to day rather than overnight stays (see Albalade & Bel 2012 also), while tourist related destinations further from the stations had experienced an increase.

There was an increase in consultant travel as a result of the TGV, with previously regionally focused businesses based in the Rhone-Alps reporting success in winning Paris business. Businesses with a broader market area reported a reduced need to relocate to the capital due to the improved access, enabling “looking for custom in Paris and carrying out the work in the calm of the province, with its quality of life” (ibid. 136). While noting these positive effects, the conclusion reached was more circumspect, noting that other factors had greater impact than the TGV. The closure of major industries had a greater impact on the region, and that the TGV had not been a decisive factor in location decisions, but seen more as a bonus.

More recent analysis of the TGV fast train system indicates that it has enabled commuting from cities more than 100 kilometres away, such as Reims and Orléans (Schafran 2015, p. 82), providing direct evidence that fast rail does facilitate long distance, regional commuting to metropolitan areas. Chen and Hall (2013, 2015) also found that introduction of high speed train services was associated with increased commuting, as well as the development of knowledge-intensive industry sectors in the regional French cities of Lyon and Lille. However, Albalate and Bel (2012) conclude that Paris has benefited the most from the TGV, and the growth in the regional cities has been at the expense of the surrounding regions.

Investigations into the effect of HSR on regional development in the UK provide similarly mixed results. The modernization of the West Coast Mainline has been criticized for its lack of consideration of regional development opportunities, which can be attributed to the private operators’ focus on serving locations with high London commuter demand and bypassing other less profitable locations (Chen & Hall 2013). Chen and Vickerman (2017) found that the HSR connection to Kent, which provides a service to the Channel Tunnel, has not had a material economic effect in comparison to the rest of the south east region, or England in total. However, there were observable affects at a smaller scale, where the locations with international rail stations have experienced greater growth than Kent, and knowledge worker jobs grew in the region in the decade from 2008. However, it is of note that in this area place of residence incomes are higher than place of work, indicating that HSR has provided more benefits for out-commuters, and to have greater residential than economic effects (ibid. 150, 151).

HSR also changes the regional areas being serviced, transforming regional centres into a metropolitan suburb, or developing economic sub-centres within a wider, polycentric metropolitan region (Garmendia et al. 2012, p. 306). This is an important distinction, with insight into the reasons for different trajectories attributed to associated developments:

... transport alone is not sufficient to attain any positive wider effects. Both transport accessibility (hubs and transport networks) and non- transport initiatives (education, housing and physical transformation) prove to be essential Chen and Hall (2013, p. 357).

There is also a contention that HSR leads to the concentration of activity within regions, due to a redistribution from the surrounding locations towards the location of the HSR station and increase polarization within regions (Albalate & Bel 2012; Vickerman 2015, p. 163). This concurs with the expectation that the HSR will

reinforce the nodes in the network rather than spaces between (Duranton & Puga 2005; Vickerman 1997), which recalls the concentrating effect of the previous transport innovations discussed in the previous section. In particular, Puga (2002, p. 397) suggests that hub and spoke models tend to “promote agglomeration in the hub of the network, as firms located there face lower transport costs to spoke locations than firms in one spoke to another”, a conclusion with implications for proposals for interlinked regions such as the Sandstone Mega-region.

In a review of the impact of HSR on property prices in Europe and Asia, Hensher, Li and Mulley (2012) observe a disparity between the effect on large cities and smaller cities. The results were mixed for large cities: property prices grew more slowly in areas surrounding new stations in Paris, Milan and Rome, while property prices in the area around the station in Camden, London, grew markedly. Of note is Lyon, where the opening of the TGV station was supported with the opening of the country’s largest shopping centre outside of Paris, a government office complex and a skyscraper, which together contributed to an increase of 43% in land values (Hensher, Li & Mulley 2012). An important finding is that HSR does not lead to property price increases without supporting developments, such as those in Lyon, and the service needs to be integrated into local transport systems to maximize benefits. Whether the increase in property values is a positive for regional communities may depend on if there is a concurrent increase in local wages, as it may lead to the displacement of regional residents (Costello 2007, 2009), particularly as house prices in some locations within metropolitan commutersheds are already rapidly increasing (Raimondo 2016).

Like Australia, economic development and strategic arguments are used to support high-speed rail proposals in Europe, such as the Trans-European HSR Network. These justifications mean that standard transport infrastructure appraisal techniques do not adequately capture the intended benefits, and appraisal based on demand forecasts and standard travel time savings are unlikely to justify such costly projects (Chen & Hall 2015; Chen & Vickerman 2017; De Rus & Nombela 2007). Hall (2013) identifies a need for further research to develop methods of appraising the spatial and land use impacts of transport infrastructure, based on analysis of the pros and cons of High Speed 2, which connects London to Birmingham, Manchester and Leeds. These considerations of the economic appraisal of HSR also raise the question of whether there are other more efficient and effective interventions to promote spatial equity, as De Rus and Nombela (2007, p. 21) suggest, “before building new HSR lines, these projects should ideally be compared with other alternative investments or policies, which could yield better social outcomes”. For example, Tomaney and Marques (2013) outline a case that in the north of England, local and inter-regional services may provide greater benefits than HS2 providing faster connections to London. While dated, Vickerman (1997) estimated that annual patronage of 12 to 15 million was required to justify HSR, which may be difficult to achieve given Australian population distributions.

The studies of the effect of HSR on regional economies provide mixed results. In summarising previous studies, Blanquart and Koning (2017, p. 11) conclude that the only point of agreement, if there is any, is that HSR induces travel demand. They list other factors that influence the outcome: city size, amenities, industry structure, and distance from the urban core are listed (*ibid.*). This is also a conclusion of other

studies of HSR, that alone it is not enough to generate regional economic development, attendant regional development strategies and investment appears to be decisive (Chen & Hall 2013, 2015; Hensher, Li & Mulley 2012).

## 5. Conclusion

A cynical reading of the history of fast rail in Australia would suggest that it is unlikely that the current round of proposals will come to fruition. However, there is a distinct shift in the way HSR is being thought about in this country: gone are the dreams fast, efficient and comfortable interstate travel, replaced by dreams of country lifestyles and easy access to city jobs. HSR is now promoted as an antidote to both metropolitan population growth and stagnating regional economies, while international experience doesn't rule out such eventualities there needs to be more than just a new rail service to provide the best possibility that these outcomes are met.

For Australian HSR proposals, international experiences indicate that the French model of integrated planning is more likely to generate economic development outcomes than the English market led models. It is also worth noting that there is a need for caution with causality, as there is a tendency for HSR to connect cities that were already growing or are expected to do so (Givoni 2006, p. 605), a finding applicable to Australian regional cities such as Geelong and Wollongong. If HSR is to 'irrigate the regions', to use the French phrase, proposals for HSR need to include the integration of local transport services, strategies to develop regional economies that compliment rather than compete with the metropolis, and a planning for land uses that maximize the opportunities presented.

Without clearly defining what the benefits of rail development are supposed to be, and considered economic, land use and in-region transport planning to support rail initiatives it is likely that the outcome will be the creation of satellite suburbs. HSR comes at significant costs, and at the moment seems to be crowding out discussion, planning and funding for other opportunities and planning for population and economic growth in our regions. It is time for clear-eyed consideration of what the problems HSR is trying to solve, whether there are other, more cost effective interventions to arrive at similar outcomes, and to be wary of unintended consequences.

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