

Governing Urban Transformation

Developing a Connected Public Transport

System in Greater Manchester: Issues of

Integration.

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To inform



MANCHESTER
CITY COUNCIL

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ii) Abbreviations

Abbreviation	Description
UPTS	Urban Public Transport System
PT	Public Transport
PTS	Public Transport System
TfGM	Transport for Greater Manchester

iii) Executive Summary

The provision of public transport is a fundamental yet defining feature of urban design and identity (Loo & Du Verle, 2016). Consider these situations; London without the bus, New York without the taxi, Sydney Harbour without the ferries, San Francisco without the cable cars, Paris without the Metro or Bangkok without the TukTuk. There are infinite more vignettes that could also be referred to yet the theme continues; cities are reliant upon their transport skeleton. The ability of people to traverse the urban landscape has always been a basic demand of urban inhabitants and will remain so as people continue to commute and travel within, around and between cities (Preston, 2010). As the urban population increases and cities are increasingly thrust into the 'sustainability' spotlight their transport systems are also subject to greater social and environmental demands. The complex national and sub-national governance architecture that now dominates urban policy making within the UK has triggered the emergence of devolution discourse and legislation (Shaw et al. 2009). This report will address issues of integration within connected urban transport systems with special focus upon the future trajectory of public transport provision in Greater Manchester. A reasoned approach is taken to focus in detail upon the challenges and opportunities of Fare and Network integration within Greater Manchester.

1. Introduction: *A reciprocal relationship; The City and Transport*

The underlying foundation of this report is the stipulation that urban public transport systems (UPTS) must endeavour to become more connected, more sustainable and more accessible (Batty, 2013; Booz & Co, 2012). The devolution of authority within Greater Manchester provides a novel rationale to approach this report. The challenges and opportunities that arise from the devolution will be addressed with regard to issues of integration within the Greater Manchester UPTS. A suite of recommendations will be presented in the concluding section to inform the client, Manchester City Council, of novel and innovative ways to approach transport integration across the newly devolved region.

2. Context: *The current moment of UK urban transport*

As stated in the project brief a distinguishing attribute of a globally competitive city is the presence of a connected public transport system. The adequate provision of a mobility service is critical to maintain the day-to-day operations and lifestyle of a city (Hensher, 2017). Greater Manchester is a prime example of a city defined by these characteristics as it seeks to develop its second-city status within the UK and lead the progressive Northern Powerhouse region to national and international success (TfGM, 2017). At the current moment of urban governance within the UK, Greater Manchester is at the optimum position to embark on radical and exciting transformational agendas. *The Cities and Local Government Devolution Act (2016)* and the introduction of directly elected metro mayors has authorised the devolution of power and fiscal responsibility for public services to regional combined authorities (Raikes, 2016). The objective to improve the connectivity and provision of sub-national transport systems is at the heart of this devolution agenda (Zhu et al. 2016; Raikes, 2016). The Bus Services Act (2017) has more recently entered into law and complements the Devolution Act by enabling the re-regulation of bus networks within the devolved authorities to create more equitable distribution of service provision (Raikes, 2016; Hensher, 2017). The current model of on-the-street competition between bus operators will be replaced through a competitive tendering process whereby operators are awarded exclusive contracts for specific route operation (Preston, 2010). The combination of these new laws creates a unique opportunity to integrate urban public transport systems (UPTS). The effective implementation of these corresponding Acts of Parliament can catalyse the transformation of UPTS and augment existing shifts within

urban transport governance (Preston, 2010; Preston & Almutairi, 2014). A consolidated, single agency of urban governance is an asset due to its capabilities to materialise integration (Shaw et al. 2009).

In recent decades, a notable shift has been observed within urban transport policy making (Raikes, 2016). Previously urban transport governance has been incredibly reactive and characterised as a 'problem-orientated' approach to policy-making (Stead, 2016). This literal interpretation of urban issues such as congestions or car accidents has resulted in path dependent add-on solutions being legitimised as the policy response (Stead, 2016; Holden, 2012). For example, congestion has been a prevalent urban issue that is commonly approached through the introduction of traffic calming measures or reduced speed enforcements (Hensher, 2017; Stead, 2016). However, a shift to an 'objectives-orientated' approach to urban transport policy is emerging (Raikes, 2016). This new perspective adopts a more holistic approach as the broader economic, social and environmental outcomes of policy are reflected upon and the best way to achieve related goals is considered (Raikes, 2016). For example, considerations of the implications and potential solutions to congestion are extended beyond the obdurate, car-dependent urban society that dominates the previous policy discourse (Stead, 2016; May et al. 2003). The reallocation of road space and the promotion of cleaner modes of transport are policies that adhere to a greater objective to reduce congestion and pollution and improve urban sustainability (Stead, 2016). In order for this observed shift to realise its potential the integration of UPTS and policy must be encouraged.

It is thus evident that an essential component of a connected UPTS is integration. Preston (2010) concludes that most UK UPTS have a sub-optimal level of integration and that an increase of integration measures will produce significant economic benefits and increase in patronage. Integration in terms of UPTS is defined as the process of transport policy planning and implementation across different modes, sectors, operators and institutions of urban governance (Preston, 2010; Zhu et al. 2016; Holden, 2012). Several authors who refer to integration in comparison to cooperation and coordination state that integration is the highest and broadest policy domain (Figure 1) (Hull, 2005; Holden, 2012; May et al. 2006)

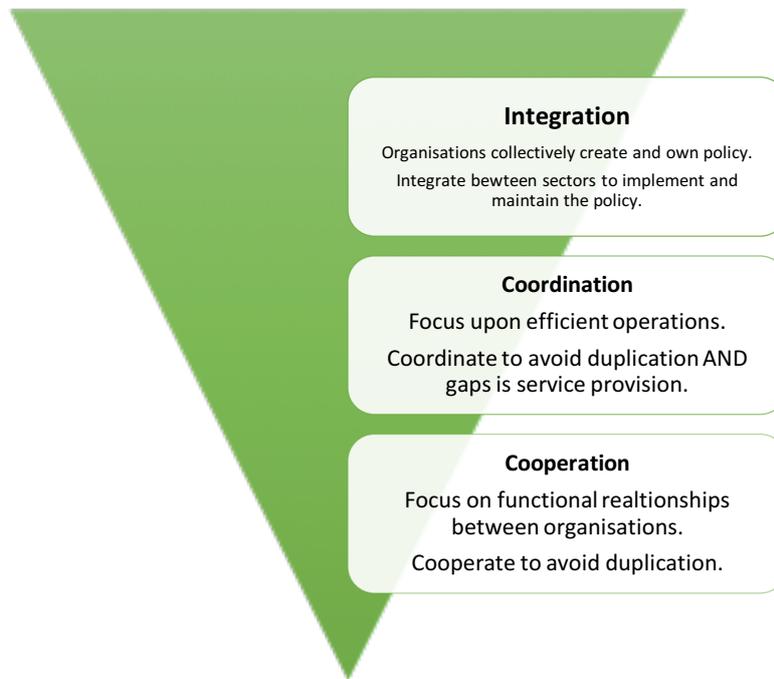


Figure 1. Hierarchical conceptualisation of Integration as a function of Coordination and Cooperation (Authors Own Diagram) (Stead, 2003; Holden, 2012; Stead, 2016).

Furthermore, integration measures can occur along horizontal, vertical, spatial or temporal axis of multi-level governance and can be conceptualised along a scalar model of increasing integration (Table I). Preston (2010) relates the highest degree of integration as an indicator of system sustainability. It is evident that the delineation of integration is complex and contested. This report will consider five categories of integration (Table II) and how these can be extended to embrace all the levels of integration (Table I).

	Level of Integration	Description
Disintegrated & Unsustainable Easiest to Implement	1. Physical and Operational	Integration of fares, timetables, ticketing, information and physical interchanges between operators.
	2. Modal	Integration of services & modes; walking, cycling, bus, rail, car. Through consistent regulation, pricing, appraisal & budgeting.
	3. Market	Integrated economic assessment. Engagement with business concerns; efficiency, effectiveness & costs of congestion.
	4. Social Objectives	Attention to the needs of different social groups, including issues of; equity, distribution & exclusion.
	5. Environmental	Integrate the environmental impacts of mobility and modal choice in transport policies and infrastructure.
	6. Institutional and Administrative	Integration of transport planning across administrative boundaries. Through an Integrated Transport Authority with effective liaison with neighbouring authorities.
	7. Policy Sectors	Integrated management of transport, infrastructure, urban development and environmental protection. Integrate general transport policy with the transport policies of education, healthcare and social services sectors. Through greater integration of land-use and transport planning.
Integrated & Sustainable Most Challenging to Implement	8. Policy Measures	Integration of policy and policies. Integration of policy packages with balanced use of fiscal, regulatory and soft measures. Integration between transport policy, environmental policy and development policy.

Table I. Ladder of Integration adapted from Hull (2005), Preston (2010) & Stead (2016). The ascending scale (1-8) refers to the increasing difficulty of implementation.

As is presented in Table 2, levels 4 and 5 are omitted from the classifications of integration. The creation of new devolved authorities is critical in reaching the top levels of integration however it is now paramount to emphasise the maintenance of lower levels and address the

Type of Integration	Description	Level of Integration
Institutional	Common institutional framework to holistically manage land-use, travel demand and transport provision. E.g. a single planning agency	6+
Physical	Proximity and ease of access at/ to mode interchange. E.g. Community transport hubs	1 & 2
Network	Integration of mode networks to be complementary rather than competitive. E.g. Optimal frequency of feeder services that maximize patronage and efficiency of trunk routes.	1-3
Information	Easy-to-use passenger system. E.g. Smarter use of Intelligent Transport Systems (ITS) & electronic signage.	1
Fare	Single fare card for multiple services to facilitate seamless modal transfer. E.g. Introduce common pricing and reduce penalties for efficient use of the system.	1

Table II. Classifications of Integration important in the development of a connected UPTS. The author has incorporated an approximate association with the corresponding level of integration (Table I). Luk & Olszewski (2003) & Booz & Co (2012).

potentiality to improve measures aimed at the middle, often neglected, levels (Preston, 2010; Preston & Almutairi, 2014). The neoliberal dominated free-market regulation of transport services and deregulation of public transport authorities has resulted in the shift from government to governance and a plurality of interests within policy-making organisations and institutions (Stead, 2016). This has reduced the feasibility of achieving level 5; Institutional and Administrative integration. Furthermore, the dynamic and wide-ranging concerns of urban inhabitants has proliferated as the urban population continues to increase and diversify. Manchester is no exception, it is one of the most diverse cities within Europe (TfGM, 2017; Raikes, 2016). Consequently, the capability of urban authorities to effectively integrate a divergent assemblage of demands is significantly inadequate (Carlan et al. 2014). These failures of integration can now be resigned to the past. The new context or urban governance in Manchester makes ‘today’ the moment to act upon improving integration of the public transport system with the overarching goal to provide globally competitive urban connectivity. The institutional context of integration has for so long hindered progress along

a scalar interpretation of integration. The opportunities that arise from devolution must now be exploited in order to ensure the lower and middle levels of integration are improved or achieved respectively.

3. Methodology

A review of the current context of transport devolution in Greater Manchester demonstrates that the most significant areas of transformation can occur in response to the increased authority of the City Council to introduce a multi-modal ticketing system and re-regulation of the bus network (TfGM, 2017). The prevalence of these issues throughout the mayoral election campaign signifies their widespread urgency. Therefore, this report will investigate the challenges and opportunities posed to a devolved Greater Manchester City Council in regard to the implementation of transformational fare and network integration transport policy. The comparison between the different categories of integration; institutional, physical, network, information and fare, and the ladder of integration highlights the common gaps in the manifestation of UPTS integration (Tables I & II). Level 4; social objectives and Level 5; Environmental concerns are most readily omitted from integration practices. This report will thus address the integration issues of developing a connected urban transport system. The following research question will guide the investigation;

- What are the opportunities and challenges posed by devolution in Greater Manchester in the implementation of improved fare and network integration policies.
- To what extent can these policies fulfil a universal achievement of integration by incorporating social and environmental measures of integration?

4. Findings:

1) Fare Integration

Fare integration is a significant driver considered to be one of the easiest levels of integration (Table I) the feasibility of universal system-wide implementation requires a higher level of integration (Preston, 2014; Stead, 2016). The devolution of Greater Manchester provides this higher level of institutional integration between transport modes and policy measures that allows for installation of a common-ticketing system. The introduction of fare integration following the Greater Manchester mayoral election is inevitable and was stipulated heavily in

the majority of manifestos released by the candidates. However, the challenges and opportunities of introducing a common ticketing system are multiple and not as straightforward as is initially portrayed (Sharaby & Shiftan, 2012).

i) Challenges

The ticketing system of a PTS must encourage the most efficient use of the system by offering cost-effective alternatives to direct travel modes such as private vehicle or taxis (Batty et al. 2015; Booz & Co, 2012). Furthermore, the purchase and use of a universal ticket must be communicated in a coherent and user-friendly manner to receive optimum societal uptake (Sharaby & Shiftan, 2012). The biggest challenge in establishing fare integration is ensuring that customers support the new system and that the incentives of integration maintain an ongoing increase in system patronage (Abrate et al. 2009). The opportunities for fare integration will be presented with consideration of best practice results in other UPTS.

ii) Opportunities

a. *Inter and Intra mode fare integration*

A common objective of fare integration is the introduction of a combination ticket that is accepted across all modes of transport. A pay-as-you-go smart card is the usual measure adopted by urban transport authorities when implementing a common ticketing system (Schmocker et al. 2016). In the short term, 1-3 years after implementation, the patronage of public transport increases as the ease of use is improved due to greater mode integration (Sharaby & Shiftan, 2012). However, this increase in ridership has often proved to be a short-term response to fare integration and further economic incentives are required to stimulate longer term increases in public transport use (Abrate et al. 2009). The Opal and Oyster smartcard schemes in Sydney and London respectively, have adapted in several ways to combat the decline or plateau of patronage (Ellison et al. 2017). Firstly, the use of flat fares has been introduced to maintain or encourage ridership. In London, flat fares were introduced on buses in recognition that many users forget to swipe off (Ellison et al. 2017; Thomas, 2013). Therefore, this ensures that the use of the smartcard is directly calibrated with the customers travel, removes the need to swipe off and eliminates the chance of any incorrect expense for the customer (Thomas, 2013). In Sydney, a system daily flat fare was introduced within the central city light rail network and a network-wide cap of \$2.50 was

implemented on Sundays (Ellison et al. 2017). This measure was introduced to encourage PTS patronage during the weekend rather than use private vehicles that results in congestion around popular weekend visitor destinations such as the eastern beaches and Blue Mountains (Ellison et al. 2017). It must be emphasised that these measures were effective in sustaining the impact of fare integration upon increased ridership (Sharaby & Shiftan, 2012). Therefore, the nature of similar measures in Greater Manchester must be considered in order to maintain use of the new system several years post-implementation. The type of incentive introduced must adhere to place specific attributes. For example system prices must endeavour to be socially inclusive by considering those members of society who are economically dependent, low-paid or unemployed (Schmocker et al. 2016). These criteria are crucial in the progression towards achieving social measures of transport integration (Hull, 2005; Stead, 2016).

b. Smartcard technology & alternatives

The use of smartcard systems is the most common method of fare integration across UPTS. The distribution of contactless pay-as-you-go cards is commonplace in many cities with integrated UPTS (Thomas, 2013). The suitability or longevity of smartcard usage and technology is rarely considered. UPTS that pioneered integrated fare systems, such as Hong Kong, introduced and demonstrated the effective use of smartcards thus legitimising their use in other UPTS worldwide (Schmöcker et al. 2016; Batty, 2013). However, the introduction of common-ticketing schemes within UPTS now must adapt to advances in technology and changes in behavioural habits over the past few years (Batty, 2013; Potter, 2016). The widespread use of contactless credit and debit cards has transformed the approach to UPTS smartcard schemes. For example, within the past year bus operators in Greater Manchester have adapted to accept contactless credit or debit card payments on board. Therefore, the introduction of a specific smartcard brand, such as Oyster, can be 'leapfrogged', a concept that refers to the ability to exploit the advantages of being a latecomer in the development or implementation of a certain, well-established, policy or technology (Yu & Gibbs, 2017; Nilsson et al. 2014). Furthermore, the consumer demand for a separate transport card has declined in line with the advancements of contactless technology. There is a greater demand amongst public transport users to combine tickets for travel with other payment methods or identification cards. For example, a significant proportion of PT patrons are students (Carlan

et al. 2014; Sharaby & Shiftan, 2012). A scheme that can prove effective within Greater Manchester is the integration of university student cards with contactless transport smartcard technology. This has been demonstrated by the partnership between ITSO (the smartcard developer), Newcastle University and Nexus (Tyne & Wear Transport Operator) (Nexus [Online]. 2013). The successful application of this scheme across a multi-modal transport system can encourage a more diverse use of PT amongst students. The proportion of Manchester metrolink patronage from students is relatively small compared to bus travel. Consequently, the introduction of an integrated fare system through measures best suited to a target demographic can effectively encourage more efficient and sustainable use of the UPTS of Greater Manchester.

II) Network Integration

The network integration of an UPTS requires there to be a seamless connection between the different modes of travel. In Greater Manchester, this requires a greater fluidity between walking, cycling, buses, light rail and heavy rail. The goal of network integration is to create an UPTS that has complementary modes rather than a competitive assemblage of services along similar routes (Booz & Co, 2012). The physical integration of transport infrastructure and interchanges through effective land-use planning is an important pre-requisite for network integration. The re-regulation of the bus network within Greater Manchester provides a trigger towards greater network integration as services can be redistributed and develop an integrated direct-feeder transport network (Nilsson et al. 2014; Nielsen & Lange, 2010). The current organisation of the Greater Manchester bus network is characterised by the presence of a few dominant routes with above average customer capacity during off-peak times and a general lack of provision in the remainder of the region other than at peak times due to demand-frequency services (BBC, 2017; Monzon et al. 2016).

i) Challenges

The greatest barrier to achieving network integration is developing a direct link between physical infrastructure design; land-use planning, and the operational design of an UPTS (Potter, 2016). To obtain levels of social and environmental integration (Levels 4 & 5 in Table I) inter and intra network integration that provides efficient and equitable distribution of

services is required (Booz & Co, 2012). The challenges faced by Greater Manchester in this respect are; 1) The concentration of bus services within certain areas due to huge disparity in demand and the lack of regulation (BBC, 2017), 2) The lack of integration between modes; mainly between the tram and bus networks.

ii) Opportunities

The Devolution and Bus bills can now provide what May et al. (2006) refer to as the 'pursuit of synergy' (2006: 320) The two complementary policies can facilitate a reciprocal implementation of greater measures of synergy within the UPTS (May et al. 2006).

a. Planning and Operational Redesign: Transport Hubs

The concept of transport hubs and the associated shift in urban planning to incorporate transport infrastructure development into wider urban land-use planning is an effective response in improving network integration (Monzon et al. 2016; Potter, 2014). The integration of transport authorities into a single agency is the first step in developing multi-modal transport interchanges that combine urban, transport and social services (Carlan et al. 2014). The best examples of this have manifested in Hong Kong and Singapore, both city states, that have more uniformity through a streamlined governance architecture (Xue et al. 2012). The reduced levels of governance creates a more efficient and sustainable approach to urban governance, a phenomenon that must materialize following the devolution of Greater Manchester (Chin et al. 2011; Carlan et al. 2014). The TfGM 'Case for Change' report signifies the potential for similar practice to unfold within Greater Manchester (TfGM, 2017). Attention will now to be orientated towards the development of suburban-urban multi-modal transport hubs within Greater Manchester that improve the integration and thus connectivity between the established bus and tram networks.

The argument posed by Loo & Du Verle (2016) states that the planning of sustainable UPTS must become a holistic urban process that focuses upon the, "Density, Diversity and Design" of a place-based, people-orientated network of mobility (Hensher, 2017). The 'triple D' concept allows a further understanding of the demographic distribution of the urban population and thus facilitate the identification of suitable locations for multi-modal

interchange hubs (Loo & Du Verle, 2016). The development of successful network integration within medium size cities, such as Manchester, has shifted towards the construction of multi-modal transport hubs within the high density, urban-suburban fringe (Batty et al. 2015; Batty, 2013). Through the analysis of each component of the 'triple D' concept transport hubs can be established at optimal points of interchange within the UPTS. As conceptualized in figure 1 the cooperation and coordination between the different mode operators can facilitate a greater level of integration (Holden, 2012). A shift to reciprocal land-use and transport infrastructure design within Greater Manchester can revolutionise the integration of transport modes at currently disconnected weak points of the system. As has been demonstrated in Hong Kong the development of multi-modal suburban-urban transport hubs can create a seamless integration between radial and orbital or direct and feeder services (Xue et al. 2012). A similar innovative transformation in Manchester could effectively improve levels of network integration along frequently travelled suburb to suburb routes that are commonly completed using private vehicles. For example, peripheral conurbations of Greater Manchester are in proximity to the established motorway system, encouraging the use of private vehicle to access major points of interest along the route such as the Trafford Centre retail complex or the airport. The introduction of complementary bus and tram services can be developed through the re-regulation of bus services to connect to the relevant orbital or radial tram routes (Nielsen & Lange, 2010; Preston & Almutairi, 2014). The implementation of this transformation can induce radical improvements to environmental integration objectives as the use of public transport is more attractive than private vehicle use (Nilsson et al. 2014; Monzon et al. 2016).

5. Conclusion: *Recommendations for the Future of Greater Manchester*

To conclude this report recommendations for the future of Greater Manchester's urban transport agenda following the devolution of the region are presented. Firstly, the introduction of a common-ticketing system is highly overdue. The fiscal authority now deferred upon the City Council provides the crucial institutional level of integration required to implement this low-level integration measure. The demand for a separate smartcard device must be considered in relation to alternative combination technologies that have emerged since the conception of smart ticketing schemes over two decades ago.

Furthermore, the longevity of fare integration is often overlooked and socially determined measures must be prepared in advance to prevent declines in system patronage (Ellison et al. 2017).

The second suite of recommendations are related to the network integration opportunities that can materialise in response to the synergistic collaboration between devolution and the Bus Bill (May et al. 2006; TfGM, 2017). The TfGM 'case for change' bid to take over regional rail stations must be monopolised and used to improve the connectivity between the established bus and tram networks of Greater Manchester (TfGM, 2017; Chin et al. 2011). The identification of key interchange points of major orbital-radial routes within the region should be the priority to creating integrated, multi-modal transport interchanges (Nielsen & Lange, 2010).

A final overarching recommendation to shape the future of Greater Manchester's UPTS is to seize the current moment of governance transformation to improve and develop a globally unique and renowned public transport provision.

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