Urban Nodes

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'Urban Nodes'

The European Union is strongly urbanised, with 432 urban nodes identified. This vast array of urban hubs has a significant economic and geographical value. Urban nodes are critical to the TEN-T network, which aims to identify any missing infrastructural links that national authorities might have overlooked while focusing on building the national network. The lack of developed urban nodes hinders network connectivity and enhances capacity bottlenecks. In June of 2024, the revised TEN-T Regulation has been adopted. This signifies the ongoing pivotal role that urban nodes have in the functioning of the single market. The interconnection of urban nodes is fundamental for building economic value both in terms of seamless transport of freight and passengers and also for enhancing sustainable mobility. However, organising investments for new infrastructure might be challenging as many stakeholders are involved, and the urban capacity is limited.

This issue of Network Industries Quarterly focuses on the role of urban nodes in the Single European Transport Area (SETA). In his contribution entitled *Urban Nodes –Predict, Provide, Plan, Prioritise and Prevent,* Alan O'Brien gives a clear picture of the context of urban nodes in Europe while illustrating the main measures needed to build a reliable urban node. Tiina Ruohonen's contribution entitled *The governance of TEN-T urban nodes* discusses the different governance mechanisms of urban nodes in Europe, suggesting to foster those collaborations that are already in place. The importance of governance is once again highlighted in Thomas Geier's piece *A Governance Framework for the Urban Nodes by the Urban Nodes*. Here, the author stresses the fact that no one-size-fits-all governance model exists, suggesting more robust communication among those actors that already facilitate inter-communal transport policy. The fourth contribution, entitled TEN-T Urban Nodes as Functional Entities by Lucian Zagan, emphasises the need for integration between urban nodes and the TEN-T network while considering challenges for urban nodes, such as governance, funding, cooperation and policy coherence.

Editors of this issue:

Matthias Finger & Elodie Petrozziello

dossier

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Urban Nodes – Predict, Provide, Plan, Prioritise and Prevent

Alan O'Brien

On 13 June 2024 the European Parliament and the Council of the European Union adopted Regulation 2024/1679, known as the TEN-T Regulation. This updated the 2013 Regulation and set the trans-European transport network policy. One of the more notable features of the regulation is that it introducead the 'urban node' as part of this transport network.

The dictionary describes a node as "*a place where things such as lines or systems join.*" This is certainly true of the nodes in the transport network. What we also see is that these nodes are almost all located in major urban settlements. This is no coincidence. Transport networks tend to grow historically and organically, evolving from local paths into longer inter-urban routes and eventually broader networks. The co-location of nodes in urban centres creates a situation in which longer distance traffic is routed through a series of urban areas.

In the TEN-T context, urban nodes play several roles. First, there is the '*first-mile and last-mile*' element of trips, in which the local network is seen as important in the context of trans-European travel. Recognising this, the requirements to develop sustainable urban mobility plans, passenger intermodal interchanges and the connectivity of airports are all relevant, given that these all target elements in the strategic-level transport network in urban areas. The regulation also reinforces the role of the urban node as a '*service hub*' (EV charging and hydrogen refuelling). Such servicing activities are often co-located with other commercial activities given that they can take advantage of a larger customer base and access to local labour markets. Finally, the urban node also recognises the need to cater for 'transit' movements, which may pass through several nodes on their route across the continent. It is in this area that the stark contrast between national and local interests arises.

Over the past 60 years or so, city planning has changed from corridor-based people-dominated spaces to lower-density and more car-dominated spaces (often referred to as 'urban sprawl' or 'urban splatter' depending on the pattern of expansion). High capacity roads facilitate access to lower density residential areas that are disconnected from the commercial heart of a city, thereby creating the need for a car to achieve minimum levels of mobility. Further growth in road capacity (and the emergence of ring roads and bypasses) also feeds the growth of retail and business districts (the out-of-town retail phenomenon), further fuelling car dependence, and in some cases erosion of the vitality of the city centre.

City planning is an eternal struggle to provide the right level of transport infrastructure to cater to the demands of users. It is when we look back at the strategic nature of transport networks (particularly the TEN-T network) and these local effects that the main conflict arises. As the inter-urban transport infrastructure is developed to allow longer-distance traffic to transit through urban nodes (e.g. bypasses), the local response to such infrastructure (the land-use effect) creates a threat to the functionality of that infrastructure.

Unlike rail, roads are almost purely infrastructure with very limited operational activity for the public sector. In essence they are free market infrastructure with fully open access for anybody with a user-license. This, combined with the land-use effects of new roads in urban areas, leads to the sometimes phenomenal growth of traffic using new high-capacity roads in cities: new retail and commercial developments take advantage of the excellent accessibility, workers become comfortable with longer distance commutes to more remote job opportunities and new residential developments far outside the urban area become more attractive to buyers. In western Europe we saw the first city ring roads become quickly congested within one or two decades of being developed, with traffic growth exceeding all expectations and requiring major (and very expensive) capacity enhancements. Further east, we see cities starting to develop new ring road infrastructure and the consequences can already be seen in terms of new out-of-town retail and commercial districts arising, even when these new roads are still at the planning stage.

Delivering such expensive infrastructure without considering the pyramid of user needs is akin to constructing a hospital with a finite number of beds and giving open access to beds equally to, say, cancer patients and those with sprained fingers. When the hospital inevitably fills, should we just build more hospitals (expensive), should we prioritise cancer patients over those with sprained fingers (effective but requiring a management effort) or should we try to understand why so many patients are showing up

with sprained fingers (thus addressing the root cause of the problem)?

On the rail network, while the same land-use effect occurs, the use of new railway capacity as a development vector is in fact encouraged (i.e. with transit-oriented-development). This reflects the different features of railways. Railway infrastructure traditionally radiates into and through city centres (as opposed to roads, where new capacity is often orbital). In this way, railways support the traditional cluster form of cities, keeping city centres vibrant and active, and combatting the orbital sprawl that is fuelled by road infrastructure.

It is clear that urban areas are complex systems with many competing demands, and that the need to facilitate longer-distance strategic movement is only one such demand (and sometimes not a priority for city authorities). Should the TEN-T road network become a victim of this development pattern in urban areas, this will subsequently have consequences at the European level in terms of journey times, safety, reliability and costs for trade and for business.

Essentially, this requires understanding of infrastructure types and a definition of users. Regarding the infrastructure type, the description of roads as either 'strategic' or 'local' is fairly well-used terminology. Strategic roads are the large highways connecting urban areas, bypassing urban areas and in some cases providing access to them, and the TEN-T network falls squarely in this category. Local roads serve local communities and businesses and essentially provide the 'last mile' part of the network.

However, for users, there is also a categorisation to be made involving the concept of 'common interest.' Strategic users are those that generate the most value for society, whether this be inter-urban trade (commercial vehicles), business-related travel (commercial vehicles or those associated with providing or maintaining services) or of course public transport. This higher-valuation is supported by economic analyses in many countries which put the value of time (and hence the cost of delays) for these users at up to three times that for other user types. Other users such as leisure travellers, shoppers and commuters generally have lower values for time and therefore low strategic value (they are also more flexible in changing destinations, travel modes and times of travel). They might therefore be considered 'non-strategic' users.

Other classifications have been attempted to categorise users. Often there is a tendency to divide trips into long-distance and short-distance, with long-distance trips being the target beneficiary of new road schemes. This ignores the planning effect, however, in which new residential communities that are developed far from the urban area as a result of new road infrastructure and which can undertake long commutes in record-breaking time can be seen as the main beneficiaries of a strategic road project, despite the environmental and social cost.

Various attempts have been made to understand and manage capacity on strategic road networks in urban areas. In 1994, the UK Department of Transport created an advisory committee to establish whether new roads generated extra traffic over and above what would have been expected in the absence of any road improvements. The committee published a report entitled 'Trunk Roads and the Generation of Traffic,'[1] which came to the clear conclusion that the impact of new road infrastructure and the erosion of capacity are due to what it deemed to be 'induced demand' responses. This conclusion led to some important changes in how transport planners approach forecasting traffic demand and the design of roads. Unfortunately, the report was prepared at a time when the conclusions were used to ensure that the road would be sized accordingly, and so it led to larger roads and even stronger responses.

The UK Highway Agency now recognises the need to manage planning responses more proactively. The most recent guidance on the 'Strategic Road Network and the Delivery of Sustainable Development'[2] recognises the need for a different development model in order to protect the functionality of the strategic network for its target beneficiaries, who are defined as those traveling between cities, those travelling to cities from remote regions, those on cross-border trips and those connecting with ports/airports/railway stations. This effectively suggests that local shopping and commuting trips in urban areas are not seen as the targets for strategic road infrastructure.

1 Standing Advisory Committee on Trunk Road Assessment (1994). Trunk Roads and the Generation of Traffic. TR010044-001678-sactra-1994-trunk-roads-traffic-report-unlocked.pdf (planninginspectorate.gov.uk)

2 National Highways UK (2022). Strategic Road Network and the Delivery of Sustainable Development. https://www.gov.uk/government/publications/strategic-road-network-and-the-delivery-of-sustainable-development/strategic-road-network-and-the-delivery-of-sustainable-development

In Ireland, an induced traffic response to road construction became visible in the 1990s.[3] With the establishment of the National Roads Authority in 1998 it became clear that some intervention was needed to highlight and manage this threat. In January 2012 the authority published its guidelines on 'Spatial Planning and National Roads,'[4] which aimed to protect investment in the capacity of national roads with appropriate policies, local planning and collaboration between planning authorities and the National Roads Authority. Nevertheless, this more proactive approach to managing the land use effects of new road infrastructure is not universal.

The problem is therefore how to protect (at the European level) this strategic function of the trans-European network. What measures are available to ensure that the balance of capacity between strategic users and non-strategic users is appropriate, and that our strategic roads are not quickly filled with local shoppers and commuters that create a 'bottleneck' in the strategic road network?

This question normally leads us to a debate between restricting access with physical measures and regulating access to roads with pricing. Many transport professionals lean towards the pricing approach given that it is based on good economic theory (i.e. those who generate most value will use it). In addition, what is often understated is that a solid pricing model also influences long-term planning and decision-making (anecdotally this can often be seen on radial motorways leading out of cities, where new residential communities are far less likely to be developed after the first toll point). In terms of hard measures, options such as ramp-metering[5] and variable speed limits on major roads close to urban areas can maintain the flow on a road operating close to capacity, but these physical measures often cannot distinguish between different users, and are therefore fairly blunt instruments that act more as safety measures than ones that improves efficiency.

Policies that target land-use planning and development can be effective but they require a clear commitment at the government level given that they involve cross-authority collaboration, which can require significant changes in mindsets in multiple agencies.

Ultimately, it is clear that providing infrastructure in an urban node as part of a broader European network is not only a question of delivering infrastructure but it is also one of the management of that infrastructure in a way that protects its strategic functionality. The growth of transport authorities from infrastructure providers to focusing more on infrastructure management is a natural evolution, with many EU countries being at different stages in this cycle. Unfortunately, this recognition of the need to manage only enters policy discussion after a few initial rounds of infrastructure delivery, unprecedented growth and very expensive expansion.

Transport planners now generally accept that the previous philosophy of 'predict and provide' (forecasting traffic growth that will occur and then providing the necessary level of infrastructure to cater for it) is driven excessively by 'user demands' and not 'user needs.' More modern planning techniques realise that the provision of transport infrastructure actively influences demand – allowing planners to influence the future rather than just responding to it as an external factor. This is often referred to as 'decide and provide.'

The TEN-T Regulation does make reference to the resilience of the transport network but refers mainly to the vulnerability of the network to climate change, natural disasters and human-made disasters. In planning terms, induced demand for road infrastructure can also be seen as a threat to resilience, given the impact that it can have on its functionality. Indeed, the TEN-T Regulation notes that in addition to the provision and upgrading of infrastructure, there is an obligation on Member States to introduce measures aimed at "promoting its resource-efficient use and resilience," although the precise meaning of resource-efficient is perhaps not quite clear.

Infrastructure is expensive. Expanding existing infrastructure in urban areas is even more expensive. A long-term planning approach to providing, upgrading and managing transport infrastructure is key to achieving resource-efficiency and the resilience, reliability, level of service and safety of the transport network.

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The governance of TEN-T urban nodes

Tiina Ruohonen

In June 2024 the Council of the European Union adopted a revised regulation on the EU guidelines on developing the trans-European transport network (TEN-T). The new law aims to build a seamless high-quality transport network that ensures sustainable European connectivity. This is not possible without adequate attention to transport networks and connectivity between and within functional urban areas. Consequently, urban nodes are given more attention and weight in the revised regulation (Regulation (EU) 2024/1679).

The urban node as a concept is a recent invention. It was introduced by the European Commission in 2013 (Regulation (EU) 1315/2013). The aim was to recognise and formalise the role of urban areas in TEN-T transport networks as important hubs that facilitate the flow of people and goods. The European Commission's impact assessment in 2021 of the now replaced directive pointed out that in particular missing links and poor connections are main challenges in integrating urban nodes in the TEN-T, and that capacity bottlenecks and insufficient network connectivity in functional urban areas hamper efforts to increase multimodality (SWD (2021) 472 final).

Urban nodes are defined in the new law as urban areas that comprise transport infrastructure that is part of the TEN-T network, including bypasses and access points to the TEN-T, which are open to all operators and users in a non-discriminatory way, notably ports, airports, railway stations, bus terminals and multimodal freight terminals. The new law requires 432 urban nodes to develop interfaces between the TEN-T and the urban dimension to enable seamless transport. This means developing multimodal transport hubs and last-mile solutions for freight, passenger transport or a combination of the two in urban nodes. All urban nodes are also required to collect and submit data and to develop sustainable urban mobility plans (SUMPs).

This is to be done in a situation in which the majority of journeys are still made by car and in which commuting is one of the main reasons for daily trips in the EU (Eurostat 2021). At the same time, European cities are tackling interlinked challenges such as air pollution, congestion and rising climate emissions from the transport sector. An expected increase in urban logistics activities and their increasing complexity is likely to augment these existing challenges (ITF Roundtable Reports No. 195 2024).

A new law may be a needed to move transport in more sustainable directions in functional European urban areas. However, it will require efforts for more policy coherence at the vertical and horizontal levels and a framework that ensures legitimacy and flexibility.

As a geographical classification, an urban node is defined by elements that are characterised as points or locations, such as specific transport infrastructure. If we accept this classification, then we must also accept that the geographical scope of an urban node cannot follow existing territorial boundaries such as local, regional or national boundaries. This implies that the 432 urban nodes will have differing geographical scopes with accompanying different existing governance bodies. Any given urban node will comprise different types of infrastructure with different governing institutions with varying degrees of formalised collaboration existing between them. Form therefore follows function. This implies that there is not a single one-size-fits-all that will allow coherent and well-functioning urban nodes that not only look good on paper but also perform well in terms of actual network connectivity.

Member states and the EU should allow sufficient flexibility and inclusiveness at the local and regional levels to determine how to best fulfil the requirements and intent of the new TEN-T regulation. This is necessary because of a basic subsidiarity principle. An additional argument is that both the concept and governance of urban nodes are likely to evolve in the years to come, given that the concept is relatively new and also relatively unknown in many of the urban areas and cities newly classified as urban nodes.

This flexibility is particularly important for urban node governance structures. The ownership and management of infrastructure and transport in urban areas is spread among national, regional and local authorities, public companies and private operators. Core stakeholders will fluctuate in any given urban node, and in many instances will require both formal and informal collaboration with the private sector and several types of public-private collaboration models. Clear engagement strategies should be

developed to ensure that stakeholders are represented and aligned with the development of network connectivity and critical infrastructure. This may be particularly critical for the logistics sector. Developments in the logistics sector are largely driven by investment and innovation in the private sector. Innovative collaborations between local and regional authorities, industry and research, similar to those in the passenger transport sector, can lead to urban logistics hubs that enable sustainable last-mile deliveries and increase multimodality in logistics and improved linkages between logistics hubs. These types of collaboration are also needed to harmonise regulations across urban areas and they could bring more governance and regulatory foreseeability to a sector that is changing rapidly (ITF Roundtable Reports No. 195 2024).

The EU should allow and encourage governance innovation and experimentation related to TEN-T governance at various levels and for urban nodes with various mechanisms and programmes. A clear aim should be to determine how the governance structures of urban nodes can best serve 2040 and 2050 policy aims. For this to work, clear expectations and benchmarks are needed and a framework that allows flexibility and encourages policy coherence across sectoral domains and governance levels. A focus on multi-level governance is therefore needed.

The concept of multi-level governance was introduced in the late 1990s and early 2000s as a way to explain the increased role of regions in EU policymaking – a result of the Maastricht Treaty which gave regions access to the Council of Ministers and established the Committee of the Regions. The concept remains important to understand the multi-level European polity of the EU, member states, regions and local authorities, and their collaboration and impacts on each other. A challenge in a multi-level polity like that in the EU is governance coordination and policy coherence at both the vertical level (across governance levels) and horizontal level (across policy domains) (Hooghe and Marks, 2001, Multi-Level Governance and European Integration). Effective multi-level governance relies on horizontal and vertical alignment of planning and transport policies and governing frameworks. This is important because of the sheer complexity of both passenger and freight transport planning, investments, adjacent sectors and policy areas such as urban and land use planning and energy.

The good news is that various forms of multi-level collaboration on urban nodes already exist in Europe. These existing structures could be an important starting point for the various stakeholders that must collaborate in an urban node. Existing collaborations are mandated either by member states or regional or local authorities for the purposes of planning, investing and maintaining transport infrastructure and services (MOVE21 Policy Brief, 2024, Planning Urban and Trans-European Mobility Together). There is a wide spectrum of existing structures such as those that primarily depend on rules (law-based) and hierarchical governance, and partnerships and network-based governance structures.

One example of existing law-based governance structures that could be a starting point for urban nodes is found in Italy. The governance of the city and the metropolitan area is the same in the fourteen largest cities in Italy. It is mandated by national law and is advantageous when planning and investing at the level of the functional urban area (MOVE21 Policy Brief, 2024, Planning Urban and Trans-European Mobility Together). However, metropolitan councils are relatively new structures, and may be too weak due to their limited financial resources and because they lack democratic legitimacy since representatives are not directly elected. For some metropolitan areas, the geographical scope of the metropolitan area may also differ in scope from the actual functional urban area, such as in Florence, making effective governance of the functional urban area, or the urban node area, difficult.

One example of existing network-based governance structures is found in Scandinavia. Sweden and Norway rely to a large degree on complex structures that deliver negotiated solutions. The West Sweden Agreement, centred on and around Gothenburg in Sweden, demonstrates how local, regional and national authorities jointly prioritise land use and transport planning in multi-level governance agreements with many sub-projects. In Norway, the focus of these agreements is primarily on investments. In the capital, the Urban Growth Agreement is a governance collaboration between the national government, the City of Oslo in its capacity as both local and regional authority, the surrounding Akershus county and three municipalities in the functional urban area. Similar agreements are in place for other large urban areas in Norway (MOVE21 Policy Brief, 2024, Planning Urban and Trans-European Mobility Together). The Scandinavian example essentially consists of negotiated solutions that require strong political participation and endorsement but that can fall prey to shifting political coalitions and short-term opportunism.

Some existing multi-level governance structures focus on land use planning and some on transport planning or

investment. For the purposes of implementing the new TEN-T regulation, collaboration between land use and urban planners and transport planners should be sought. Legitimate concerns related to socio-economic development, transport poverty and economic regeneration of specific territories should not be relegated to transport planners alone. Work on increasing connectivity and removing bottlenecks should avoid contributing to further urban sprawl. Local and regional authorities will need to balance different needs and perspectives and seek to increase connectivity in the TEN-T and in urban areas, while at the same time combatting urban sprawl with various measures such as further densification of urban areas.

Authorities should seek to integrate existing institutionalised mechanisms and structures in the work to meet the requirements of the new TEN-T regulation. Guidance from the EU could help urban node stakeholders determine the process and format of a proper scoping exercise to determine if existing structures are fit for purpose and under what conditions new or augmented structures are needed. Key stakeholders in urban nodes should welcome the new law as an opportunity to redraw or update existing governance structures to better fit today's investment priorities for transport infrastructure and service development.

Similarly, the introduction of the new law can be an opportunity to assess the democratic legitimacy of the governance of urban nodes. An urban node must have democratic legitimacy to function properly. Inhabitants of European cities and urban areas vote increasingly more liberally compared to the national level and there are indications that this trend and the urban-rural divide will continue to grow in the years to come. Failure to take this into account at the member state level may lead to criticism about low democratic legitimacy and doubts whether the interests of urban nodes are adequately represented. Proper care should therefore be taken to ensure democratic legitimacy of the governance of urban nodes and their infrastructure priorities. This again means allowing a certain flexibility in the governance of urban nodes across Europe, and in some instances allowing new governance models and engagement practices. Done well, it would also foster more policy coherence at both the vertical and horizontal levels, allowing more aligned policy development for urban nodes.

Determining the precise area of responsibility and scope of each urban node requires a step-by-step process. The key stakeholders identified in each core urban node area should prioritise a mapping exercise to determine all the points and functions that define the urban node. The same key stakeholders should establish a clear overview of the different governing institutions, whether they are private or public entities. These institutions should in turn propose a multi-level governance structure that would allow collaboration across governance and institutional boundaries with appropriate and necessary mandates. This structure should be allowed to determine how to meet the requirements and intent of the revised TEN-T guidelines in the best possible way and have a mandate to negotiate and deliberate on behalf of the urban node. A well-functioning urban node that can meet the requirements and intents of the new law is in fact a well-functioning multi-level governance structure that enjoys democratic legitimacy.

Democratic legitimacy is also needed at the TEN-T corridor level. Urban nodes need agency and representation in TEN-T governance to meet the intentions of the new TEN-T law. A suggestion that member states are the conduits and points of reference for urban nodes will be met with scepticism by some local authorities. It should be a task for the EU to determine how to ensure that urban nodes have agency and representation on their own terms while also allowing workable structures at the TEN-T corridor level. This represents a practical and political challenge that should receive attention in the years to come.

A governance framework for urban nodes by urban nodes

Thomas Geier

Europe's many conurbations are the economic and cultural powerhouses of the continent. The importance of cities, metropolitan areas and their surrounding regions to Europe's economic competitiveness is now rightly reflected in the EU's major transport instrument, the Trans-European Transport Network Policy (TEN-T), with increased prominence of urban nodes in its recently adopted revised version.

Urban nodes play an important role in Europe's transport networks as it is conurbations where most long-distance movements of passengers and freight have their points of origin and destination. It is in urban nodes where most transfers within or between transport modes occur. In addition, the number of journeys taking place within an urban node represent a substantial proportion of all journeys, particularly when looking at daily mobility. This intertwining of long-distance traffic and growing volumes of metropolitan journeys make urban nodes particularly vulnerable areas where capacity bottlenecks and insufficient multimodal connectivity quickly hamper performance and impact economic resilience.

While 88 urban nodes were incorporated in the TEN-T policy in Regulation (EU) 1315/2013, it is the revised version, Regulation (EU) 2024/1679, which came into force in summer 2024, that sets out specific objectives for transport planning and transport indicators in urban nodes. The revised regulation also extends the list of urban nodes to 432. This extension was achieved by considering all the conurbations along the TEN-T corridors with an urban centre of at least 100,000 inhabitants and at least one city per NUTS-2 region to be urban nodes.

This somewhat late accession of the wider urban dimension to the TEN-T policy must not mislead. Strategic transport and infrastructure development is not a new phenomenon in cities, metropolitan areas and their surrounding regions. Neither is it a green field but it shows strong institutional substance, well-established often long-standing jurisdictions and proven processes that reflect and seek to address specific context conditions and needs of the relevant conurbation.

The context of an urban node governance framework

An effective framework for the governance of urban nodes at the EU level will have to recognise the existing structures of the organisation of transport and infrastructure. These differ vastly among member states, and even among regions, metropolitan areas and cities in the same member state. As the devolution of transport matters is approached very differently in different member states, different planning cultures and approaches to decision-making will have to reflect this.

While infrastructure and transport service planning can have a significant impact on local liveability, the urban node governance framework must ensure democratic legitimacy and allow the involvement of local decision-makers to effectively balance the legitimate interests and needs of daily metropolitan mobility within and among the urban, suburban and peri-urban areas of the urban node and long-distance traffic passing through the urban node along the TEN-T corridor.

The governance framework should encourage the engagement of all relevant stakeholders and develop procedures to establish a fact-basis regarding mobility data, trends and systemic infrastructure needs to reduce bottlenecks and facilitate multimodality for more resilient and efficient transport networks for passengers and freight, and for metropolitan and long-distance traffic.

To this end, a pragmatic model for the institutionalisation of urban nodes is required that addresses the above-described context conditions and takes on the coordination of stakeholders to make urban nodes capable of action.

Form follows function

It is quite clear that a single one-size-fits-all governance model for urban nodes, especially regarding institutionalisation, does not exist. A top-down technocratically devised structure will not succeed in reflecting local context conditions. However, context matters, particularly in transport due to its culturally formative character and substantial physical footprint.

While TEN-T and urban node governance provide real value to Europe's conurbations and its institutions, they must refrain from using purely theoretically driven concepts like the notion of the functional urban area as a starting point and instead embrace subsidiarity by recognising and strengthening existing regional structures.

It is the intended functions of urban nodes that may provide an opportunity for clarity and useful harmonisation across all 432 conurbations without a need to impose rigid institutional structures top-down. By enabling regional institutionalisation based on a clear set of envisioned functions, the cities, communes and relevant transport stakeholder organisations in each urban node can construct the level and form of institutionalisation necessary to fulfil these functions in their contexts. This can happen by leveraging existing structures and processes, like regional fora for spatial planning and already established organisations for collaboration on transport across municipalities, such as metropolitan area bureaus and integrated public transport authorities.

Given the ambitious timelines set out in the revised TEN-T Regulation, which foresees an approach that builds on existing structures and provides an outlook for continued convergence over time, it appears to be not only desirable but simply necessary to create local buy-in to meet these targets.

An inspiring precedent: Public transport procurement

Establishing a governance structure with useful levels of harmonisation across Europe with regional institutionalisation based on a clear set of functionalities prescribed at the EU level is not a totally new pathway. A precedent that can provide inspiration to the development of urban node governance is the case of public transport procurement in Europe.

Public transport is considered a "service of general economic interest" as established in The Treaty of Lisbon, which makes public compensation of services permissible. The manner in which such compensation and preferential treatment of services providing such utility can take place in the EU is governed by Regulation 1370/2007, often referred to as the Public Service Obligation (PSO) Regulation. This states that public transport operators can only receive public compensation or time-bound monopolist rights after an awarding procedure, in which either a concession for a given area or a transport service contract for a specific set or volume of transport service is granted to the operator by a competent public transport authority.

For the many public transport operators in municipal, regional and national ownership, there is a possibility to directly award a contract or concession when specific conditions are met to prevent market distortions. For example, a municipal operator receiving a directly awarded contract for local transport services may not operate outside the jurisdiction of the competent authority that awards its contract, thus preventing the operator from achieving a competitive advantage based on the monopoly it enjoys in its home market.

An increasing number of public transport service contracts, however, are awarded competitively. By means of a tendering process, the competent public transport authority determines the most advantageous offer according to pre-defined transparent criteria and awards the concession or contract to the winning transport operator.

The PSO Regulation, which guides public transport procurement in all the member states refrains from imposing specific governance, geographical scoping and institutionalisation and instead provides a clear yet pragmatic functional description of the envisioned scheme. By defining the role of competent public transport authorities with a description of their functions rather than their institutional setting or geographical footprint, the PSO Regulation enables regional institutionalisation of the role of specific local context conditions and existing structures.

While long-distance transport awarding is generally allocated to the transport ministries in most member states, the governance of local, metropolitan and regional public transport services was substantially altered as all over Europe the role of competent public transport authorities (PTAs) was institutionalised differently.

In many member states, this 'European role' of competent public transport authorities was allocated to the various municipal transport departments. In member states in which metropolitan collaboration was already more advanced, the existing but loose partnerships once formed organically for inter-communal planning or tariff integration across transport modes were strengthened and formalised. In other regions, regional govern-

ments or provinces would take on the role. Some member states developed central authorities or regionalised agencies within their national governments or enabled the development of regional agencies with special powers and designated regional assemblies for democratic legitimisation.

Nowadays, more than twenty years after the introduction of the PSO Regulation, the functional goal set out for the competent authority role has been achieved and natural harmonisation effects appear, with many conurbations in Europe clearly developing towards truly integrated public transport systems of metropolitan scope. This continues the successes and good practice of regions that used the institutionalisation of the competent public transport authority role as described in the PSO Regulation to develop integrated metropolitan transport planning, awarding and financing authorities as specialised organisations capable of action.

Clear functions and inspiring pathways

A governance framework that focuses on the definition of the required functions and envisioned outcomes of urban nodes, rather than specific geographical scopes and institutional structures, will enable cities, regions and transport stakeholders to establish the required level of institutionalisation in their contexts. This regional institutionalisation of the 'European role' of the institutionalised urban node will start an organic process of useful harmonisation which is beneficial locally and at the EU level, somewhat comparable to the precedent of the competent public transport authority role established by the PSO regulation.

Ideally, this harmonisation potential is strengthened with ambitious and inspiring pathways for continued converging development. EU level stakeholders, the existing corridor governance, academia and the metropolitan transport sector could further clarify what spectrum of functions and geographical scope the institutionalised urban node might aspire to include going forward or bridge to other transport related policy fields. For example, by providing further evidence that the institutionalised urban node should aspire to cover at least the full geography of the FUA or exploring potential roles for the institutionalised urban node in the development of the common European Mobility Data Space (EMDS).

What could this mean in practice?

There is a consensus that the urban node covers more than the area of its name-giving city. To achieve an effective degree of institutionalisation for this wider geography in a timely manner, existing institutions that facilitate inter-communal transport policy work should take on the role of the institutionalised urban node and evolve from there. Think of metropolitan area bureaus or integrated public transport authorities (PTAs). In some cases in which such specialised organisations do not exist, loose institutionalisation led by the transport department of the central city may be acceptable to start with. In other cases, a regional authority, province or even a national agency might be best situated to pragmatically coordinate the functions of urban nodes. This might particularly be the case in smaller member states and those member states where devolution in transport policy is less prevalent.

While these real-world jurisdictions might not cover the entire functional urban area from the start, the outlook of eventually increasing the geographical scope to do so can provide an exciting pathway to the growth and formalisation of such often organically developed bodies. This approach also addresses the matter of polycentric urban nodes effectively as many PTAs and metropolitan areas already serve polycentric regions.

A final conceptualisation of urban nodes regarding their envisioned functions is yet to be devised. However, some functional dimensions can be derived from the timeline presented in the revised TEN-T regulation, while others appear desirable from a corridor governance or wider transport system perspective. These dimensions include:

- **Representation of the urban node in the corridor governance of the respective TEN-T Corridor(s).** Effective corridor management is already highly complex. However, to ensure representation of legitimate metropolitan interests in the wider corridor governance, a representation of urban nodes is necessary. It appears useful if one specific agency per urban node represents the interests of the entire urban node. This suggests the need for an institutionalised urban node or an allocation of the urban node role to one agency that receives the representation mandate.

- **Development of the required Sustainable Urban Mobility Plan (SUMP).** The 2027 deadline set in the revised TEN-T Regulation is very ambitious in this respect. It remains unclear whether the intended strategic transport policy plan should cover the wider geographical scope of the urban node or whether a SUMP for the central city suffices at the beginning. Nevertheless, this functional dimension suggests a need to allocate the urban node role to an agency with some inter-communal policy coordination or outright regional planning capacity.

- **Reporting the required set of Sustainable Urban Mobility Indicators (SUMIs).** The calculation and delivery of SUMIs requires allocation of the urban node role to an agency that enjoys a certain degree of trust, power and technical capability, to ensure all stakeholders in the urban node engage in the required sharing of data.

Additional functional dimensions that appear desirable from a transport system perspective and may provide inspiring development pathways could include, among others:

- **Funding.** The urban node role acting as a single regional coordinator for EU transport funds;

- **Financing.** The urban node role receiving a specific tax status or right, e.g. the right to first refusal for land to enable land-value capture with transport projects;

- **Project delivery.** Establishing the urban node role not only as a planning agency but as a regional competence centre for the delivery of transport projects.

Enabling local institutionalisation that builds on existing structures by means of functional descriptions rather than prescribing an institutional definition of the urban node at the EU level addresses both regional capacity building and formalisation of inter-communal transport policymaking, and the need for European harmonisation in a useful and achievable manner. To support these diverse regional pathways to institutionalisation, the EU level together with academia and sector representatives should continue to devise and discuss ambitious development scenarios for the urban node role to inspire a continued governance convergence wherever this is useful in Europe's conurbations.

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TEN-T Urban Nodes as Functional Entities

Lucian Zagan[1]

Urban nodes in the Trans-European Transport Network (TEN-T) are not administrative entities but functional ones. In line with the functional nature of urban nodes, enhancing multi-level governance processes is essential for efficient, connected, multimodal and sustainable nodes.

Introduction

Europe is widely urbanised and features a diverse array of cities, which are essential centres of economic and social activity. By their very nature and function, urban nodes – comprising cities and their functional areas – are the starting points or the final destinations of passengers and freight moving on the Trans-European Transport Network. At the same time, they constitute the space where different levels of transport networks converge and points of transfer within or between different transport modes. As primary connection points, urban nodes are crucial elements in the TEN-T. The 2024 revised TEN-T Regulation (European Union, 2024) acknowledges this by reinforcing the role of urban nodes in the TEN-T. This involves expanding the list of urban nodes to 432 across the EU countries, and setting up new functional requirements for the nodes identified.

The urban nodes notion

The TEN-T Regulation defines urban nodes as "urban areas where elements of the transport infrastructure of the trans-European transport network for passengers and freight, such as ports, including passenger terminals, airports, railway stations, bus terminals and multimodal freight terminals, located in and around the urban area are connected with other elements of that infrastructure and with the infrastructure for regional and local traffic, including infrastructure for active modes" (European Union, 2024, Article 3, §6). In simpler terms, urban nodes are areas where long-distance transport and urban mobility come together. At the same time, they are the starting point or the final destination of most trips, including both passengers and freight, in the trans-European transport network.

The notion of urban nodes brings together two areas of policy: urban mobility, which involves supporting measures targeting trips and transport needs in urban areas, complemented by the concept of Sustainable Urban Mobility Plans (SUMPs), and TEN-T policy, targeting transport corridors and modes connecting the European territory.

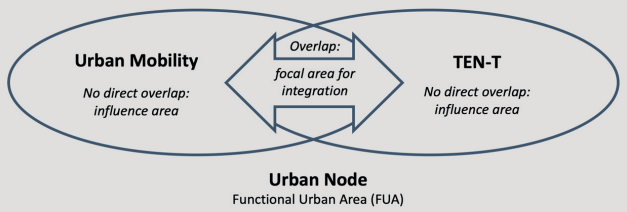

Figure 1: The VitalNodes representation of the urban nodes notion[2]

Integration of urban nodes recognises their crucial role as origins or destinations for trans-European transport, and at the same time as key points for multimodal transfer, hosting relevant transport infrastructure and terminals, for both passengers and freight. The urban transport network provides connections for consolidation and distribution across the urban area, so-called first and last-mile trips.

The 2024 revision of the TEN-T Regulation represents a change of philosophy in directly integrating urban mobility factors in TEN-T policy. This is also reflected in the New EU Urban Mobility Framework (European Commission, 2021), which was published at the same time as the Commission proposal for the revision of the TEN-T Regulation as part of the December 2021 Efficient and

1 Lucian Zagan, Project Coordinator – Mobility, Eurocities, lucian.zagan@eurocities.eu. The reflections presented here are informed by participation in the EU-funded Horizon projects SCALE-UP (grant agreement 955332) and MOVE21 (grant agreement 953939).

2 VitalNodes, 2019, p. 6.

Green Mobility Package. This is a clear recognition of the crucial role of urban nodes in an efficient, multimodal and sustainable transport network. The functional requirements for urban nodes are clear indications of this. The 432 recognised urban nodes will have to:

adopt and monitor a Sustainable Urban Mobility Plan (SUMP) by 31 December 2027;

collect and submit to the European Commission urban mobility data in the fields of sustainability, safety and accessibility according to the indicators and methodology defined in a subsequent implementation act – also by 31 December 2027, and then at regular intervals;

develop multimodal passenger hubs to facilitate first and last-mile connections, including facilitating access to public transport infrastructure and active mobility – by 31 December 2030;

develop, subject to a socio-economic cost-benefit analysis, at least one multimodal freight terminal, if such a terminal does not already exist, allowing sufficient transhipment capacity within or in the vicinity of the urban node – by 31 December 2040 (European Union, 2024, Article 41, §1-4).

Additional priorities concerning charging and refuelling stations, seamless interconnection between transport modes, greening urban fleets, mitigation of the exposure of urban areas to negative effects of transiting transport infrastructure, the use if ICT tools and ITS are also proposed in line with the TEN-T objectives.

Addressing complex issues in freight and logistics management, passenger flow optimisation, sustainability, climate change, urban liveability, emerging technologies and particularly the integration of urban nodes in the broader transport network requires coordinated and comprehensive policy responses that often extend beyond the city authority. To effectively tackle these challenges, policies must be planned and developed at the level of the functional urban area (FUA). A Sustainable Urban Mobility Plan (SUMP) should encompass the entire functional urban area and ensure collaboration across administrative and institutional boundaries. This approach promotes cooperation and synergies between different levels of government and across various policy sectors, ensuring a more integrated and effective response to urban mobility and transport challenges.[3]

3 For a discussion of the principles of SUMP planning, see Rupprecht Consult, ed. (2019), section 1.1, pp. 9-13.

Challenges facing urban nodes

The actual flow of people and goods and planning at the level of the urban node is a crucial criterion for the relevance and comprehensiveness of a mobility plan. Administrative boundaries operate under a different logic, making it difficult to effectively plan for the functional urban area. The functional nature of urban nodes results in a number of specific and related challenges that can be categorised under governance, funding, cooperation and ensuring policy coherence.

GOVERNANCE

The management of transport and mobility in urban nodes is a complex task, as responsibilities are distributed across various levels of government – national, regional, local and in some cases sub-local or district authorities. Furthermore, within each of these levels, different departments or agencies often play a role, making coordination even more challenging. As a result, effective multi-level governance and collaborative partnerships are essential for urban nodes, where the needs and challenges facing local and functional urban area mobility must be reconciled with the need for effective long-distance transport. At the same time, TEN-T governance and corridor coordination should consider urban node factors and ensure that the priorities of cities are reflected in the TEN-T priorities. This requires another level of cooperation, which adds to the complexity. Successfully navigating this complex governance landscape is key to creating a transport system that supports both the local quality of life and broader economic and transport connectivity objectives.[4]

FUNDING

Investment needs in urban nodes are diverse and encompass a wide range of projects, including large-scale infrastructure developments, multimodal passenger hubs, freight terminals, public transport systems, cycling infrastructure and shared mobility services, among others. These initiatives are driven by various levels of governance – local, regional and national – and are financed by a combination of budgets at these levels or by funding in EU programmes. Urban nodes themselves have limited

4 Chinellato & Morfoulaki (2019) identify and analyse various models of metropolitan governance in the context of sustainable urban mobility planning and implementation, and draw a number of relevant lessons and recommendations.

fiscal powers as they do not directly collect taxes. Instead, their investments are typically financed by local and regional funds or allocations by national governments. This creates a certain degree of dependence on external funding sources, which limits their autonomy in planning and decision-making. In addition, the challenge of securing and coordinating funding to meet the broad range of investment needs and balancing these diverse funding streams with the unique requirements of each project add to the complexity of effectively responding to transport challenges in urban nodes.

COOPERATION

The governance of urban nodes must address the diverse needs of municipalities, provinces and regions exercising authority in the functional urban area, and also the interests of the central government. When defining strategies for urban nodes (e.g., SUMP) or implementing various projects, resistance is likely to be encountered at various governance levels that are hesitant to delegate some of their responsibilities and competencies to another entity. To navigate this complexity, it is essential to establish effective cooperation mechanisms and maintain ongoing efforts at all governance levels to ensure their functionality and effectiveness. Aligning stakeholders and securing political support are critical components of successful cooperative models. These collaborative approaches foster a unified vision and enable efficient execution of projects that meet the needs of urban nodes, ultimately enhancing their overall governance and operational effectiveness.

POLICY COHERENCE

To ensure that actions effectively address their intended objectives, policy coherence is essential. It is important to recognise that different planning paradigms can lead to various forms of policy incoherence. For instance, national transport masterplans aim to enhance connections for passengers and freight while addressing bottlenecks along corridors. However, these plans often emerge from a 'predict and provide' paradigm, which focuses on forecasting transport needs and expanding capacity accordingly. In contrast, urban nodes in the network experience significant negative impacts of traffic, including congestion, poor air quality, noise pollution, road safety risks and diminished attractiveness and liveability. In response, cities and regions are developing SUMPs that aim to create sustainable transport systems and mitigate these adverse effects. The SUMP concept works on a 'visioning and backcasting' planning paradigm, starting with a vision of the future city and working backwards to identify the necessary actions to achieve this vision. This is oversimplified, but latent forms of policy incoherence should not be underestimated.

Urban nodes as functional entities

An immediate response to the requirements set in the TEN-T Regulation might be to institutionalise urban nodes and establish a new level of administration. However, this approach would be misguided and would not effectively address the complexities associated with urban nodes. Institutionalisation should not compromise functional considerations.

There exists a hierarchy of types of transport infrastructure and strategies that converge within urban nodes, leading to inherent complexity. Multi-level governance processes are often established to manage this complexity. Most urban nodes already have local institutional arrangements in place for planning mobility. A pragmatic approach (also considering the rather close deadlines for meeting the requirements) would be to build on these existing arrangements. This involves enhancing capacity and fostering cooperation to dynamically respond to relevant functional constraints as they emerge.

Functional factors are fundamental in the concept of urban nodes, and their realisation hinges on vertical integration. Vertical integration examines how local policies align with broader regional and national frameworks, and it ensures compliance with relevant regulations across different levels of government. Effective integration and coordination among various government tiers are crucial to address the challenges previously outlined. The success of urban nodes will largely depend on their ability to adapt and coordinate across administrative levels. Achieving balanced and effective governance of urban nodes requires the development of processes that not only meet local and regional needs but also align with national and EU objectives, thereby linking administrative capacities at all levels. In a multi-level governance setting, responsibilities for specific tasks should align with the competences and executive powers of the relevant administrative levels. While the central city in an urban node can take the lead in fostering cooperation, this will ultimately depend on the local context and the unique circumstances at the local level. It is likely that a polycentric urban area will establish a different cooperation model compared to

a functional urban area centred around a single dominant city.

When it comes to urban nodes, a distributed governance model is preferable to a centralised one. If a single level of governance were tasked with overseeing implementation, establishing the legal framework, coordinating, monitoring progress, ensuring quality control and managing funding and programming, this would probably lead to organisational overload. Moreover, there are important issues having to do with the principle of subsidiarity, which posits that decision-making authority and responsibility should be allocated as closely as possible to the operational level to facilitate well-informed decisions.[5] However, there remains a legitimate need for coordination and ensuring a joint approach across national transport networks and the TEN-T. A distributed governance model allows the appropriate decision-making authority and responsibility to reside at each relevant governance level. This model promotes effective coordination through multi-level governance, ensuring that each level can address its specific responsibilities while working collaboratively towards common objectives.

Conclusions and recommendations

The reflections presented here allow drawing a number of key takeaways and recommendations:

The revised TEN-T Regulation emphasises the need to incorporate urban mobility factors in transport policy, recognising the pivotal role urban nodes play in promoting a sustainable and efficient transport network.

Urban nodes are defined as functional entities in the TEN-T serving as crucial points for the integration of long-distance transport and urban mobility, for both passengers and freight.

Effective management of urban nodes requires enhancing multi-level governance processes that align with their functional nature. This involves coordination across national, regional and local levels to address complex transport challenges. Funding is an important part of these coordination efforts.

The governance of urban nodes involves multiple authorities, which leads to potential conflicts and complexities. Effective cooperation mechanisms are essential to align diverse stakeholder interests and ensure the successful implementation of transport initiatives.

A distributed governance model is preferable for urban nodes, as it allows appropriate decision-making authority at various levels while promoting effective coordination. This model supports the principle of subsidiarity, ensuring decisions are made as close to the operational level as possible.

A reinforced role of urban nodes presents a significant opportunity to improve the efficiency of the TEN-T. However, this also brings responsibilities and challenges that must be addressed. Key questions remain regarding the structures necessary for effective coordination among various stakeholders in urban nodes. Specifically, who will be responsible for establishing these collaborative frameworks, and what support programmes are needed to facilitate this coordination? These are critical considerations in the governance of urban nodes and the implementation of TEN-T. In addition, EU coordination is essential to meet the functional requirements of urban nodes, and appropriate mechanisms and tools for this coordination have yet to be established.[6]

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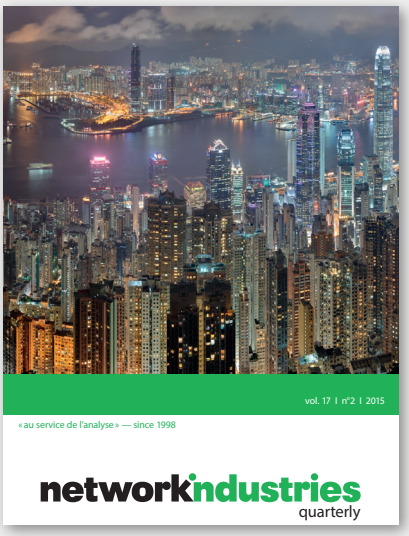

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